MAY 1, 1992
VOLUME FIVE NUMBER ELEVEN
SEVEN DOLLARS

CIO

THE MAGAZINE FOR INFORMATION EXECUTIVES

COVER STORY:

Making A World Of Difference In Corporate Travel

ALSO INSIDE:

Empowerment's Pitfalls Put Payoffs At Risk

Rosenbluth Inc.'s Hal Rosenbluth

AN INTERNATIONAL DATA GROUP PUBLICATION

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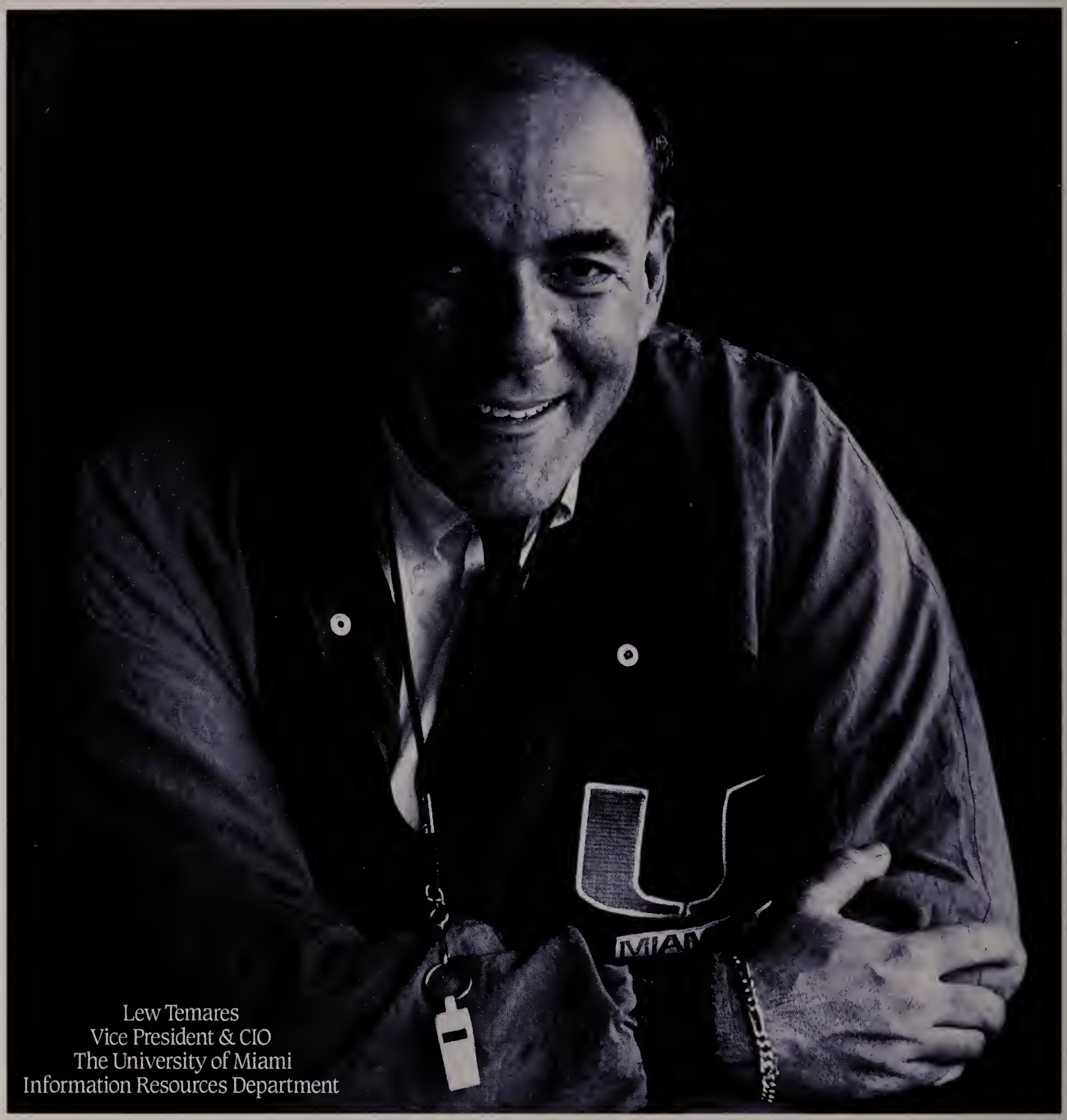

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Cover photo by Kent Hanson

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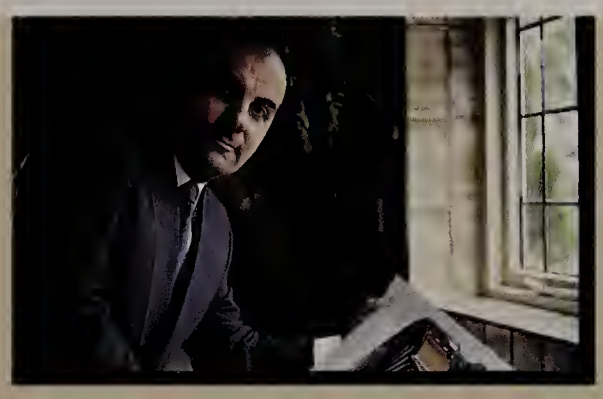

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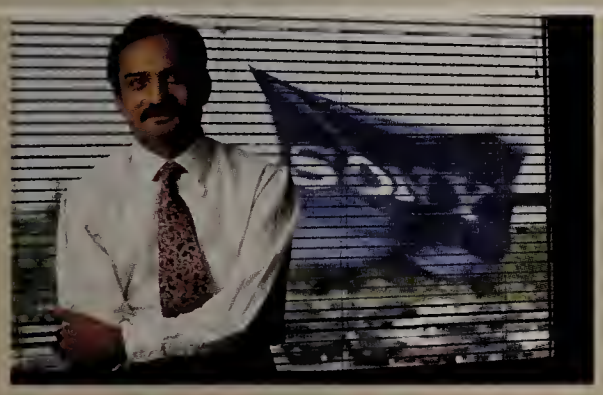
Tom Jeffery
Sr. VP, Information Systems
Target



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Roger Strand
Application Development Consultant
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Building bridges to openness **58**

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Managers involved in business reengineering projects are learning that simple is not only elegant—it's also highly competitive.
By Robert M. Rubin

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By providing links among disparate components, middleware makes possible the transition to open systems.
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HELD OVER BY POPULAR DEMAND

When two software companies decided to join forces, their executives used videoconferencing to smooth the process. Once the merger was complete, the technology evolved into an all-purpose tool used by employees companywide.
By Megan Santosus

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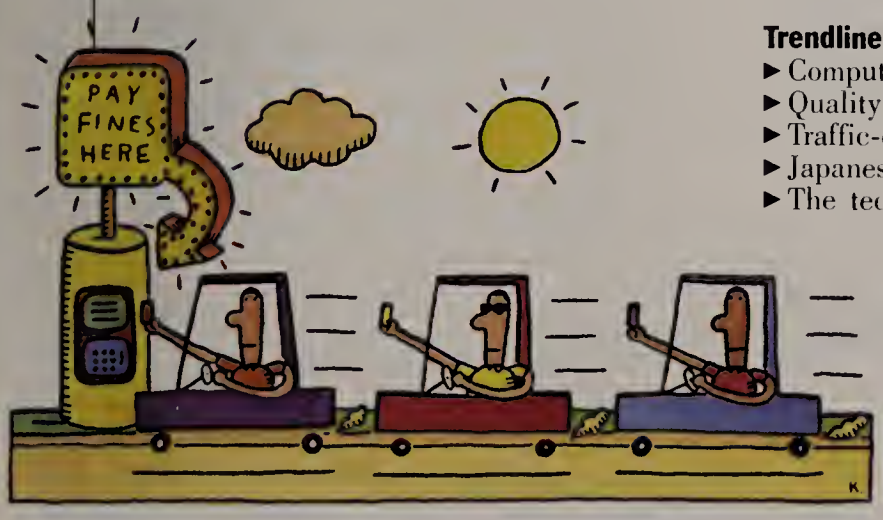


A fast lane for fines **12**

Now that information systems are so pervasive within many organizations, you might expect that the idea of employee empowerment, long touted as one of the major benefits of IS, would be well on its way to becoming a reality. But as with so many aspects of information management, the enabling technology and the human and organizational ability to change business processes are in two separate stages of evolution.

In our article "The Perils of Power," beginning on Page 24, Senior Writer Thomas Kiely takes a hard look at empowerment. In many cases organizations are merely paying lip service to employee empowerment or trying it out on a piecemeal basis. For empowerment to work, it has to be part of an overall organizational change. The key is giving employees the authority to make decisions on how work gets done.

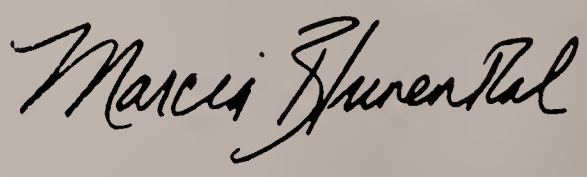
Those studying the issue reveal that empowerment is sometimes used as an excuse to eliminate a supervisory level. It may also be used to further someone's own political agenda—to disguise as a team concept a decision already made.

Middle managers fear employee empowerment because conveying and managing information is a good portion of their positions. Workers often resent the greater responsibility they inherit, especially when they're not rewarded with more money or status. Some unions are actually blocking the road to empowerment.

Yet some forward-thinking enterprises, like San Diego Gas and Electric, Sara Lee Knit Products and Hamilton Standard Commercial Aircraft Electronics Inc., are fostering the self-managed employee. Some say this effort takes a good three to five years to put in place.

Other articles this month look at how IT helps companies compete in new and different ways. Senior Writer Richard Pastore's profile of Rosenbluth Inc., beginning on Page 44, depicts how IT has carved out a highly profitable niche for the travel agency and is paving the way for it to expand into IS outsourcing. And on Page 52, Contributing Writer Lucie Juneau focuses on the art of logistics, once largely associated with the transportation industry but now applied to tying together various functions both in and out of the enterprise.

Seedling learning curves for applying IT are constantly sprouting. Keeping track of these opportunities is a continuing part of the CIO's mission.



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"Today we are at the point where the chief information officer has to become a marketing person, to market information in the organization."

—Peter F. Drucker
Business professor, author and management expert
March 10, 1992

At *CIO* magazine's recent Perspectives conference in San Diego, keynote speaker Peter F. Drucker reminded us in his crisp yet visionary style that technology vehicles used to process information provide the means to an important end. Technology yields information. But it's what management and people throughout the organization do with that information that will ultimately determine a company's success or failure.

According to Professor Drucker, information technology will not be able to improve productivity as promised unless people learn to think through what information they need to do their jobs. This information could take on many different forms, depending on the organization's business, competitive environment and goals.

But timely information about *external* indicators such as customer satisfaction, economic forecasts and market trends were high on Professor Drucker's list of focus areas. In his view, companies that truly want to ensure that their business decisions are based on external indicators must deemphasize obsolete accounting concepts and internal corporate information.

Professor Drucker also challenged CIOs to revamp their traditional technical role as guardians of the enterprise's computer resources and concentrate instead on teaching people how to create and use information. He views the CIO's role in the '90s as that of both teacher and marketer, the same view held by *CIO* magazine.

Through our magazine, conferences and other services, *CIO* will continue to provide you with the information you need to meet Professor Drucker's challenge.

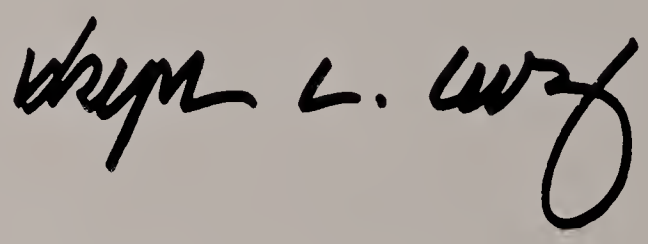

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PHOTO BY GEORGE SIMIAN

Coming In CIO

Strategic Outlook: Communications

The applications that new, high-bandwidth technology will usher in have been talked about for a while: video-teleconferencing, multimedia and workgroup computing, collaborative engineering, LAN-to-LAN communications and networked supercomputing. While all of these feats can be accomplished right now over costly high-speed communications lines, a groundswell of interest seems certain to pull them into the mainstream. As one consultant put it, "What's going on in telecommunications makes the 1980s look like a turtle on Valium."

A Mature User

Its membership may be getting on in years, but the American Association of Retired Persons isn't lacking in young, exciting technologies. GUIs, OOPs, multimedia, optical disks, CD-ROM, fiber optics and satellite communications are a few of the technologies in AARP's future, all geared to support the largest membership organization in the country.

Education of a Line Manager

Walt Coleman, vice president of consumer services operations at Whirlpool, says he had just enough knowledge of IT to get him into trouble when he set out to develop and implement a one-call customer-service hot line. The project turned out to be a baptism by fire.

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The camera doesn't lie. And that's a darn shame, especially when your most flattering photo was taken while you were still a brunette, or if all the snapshots documenting little Desmond's first trip to Disneyland also include your good-for-nothing ex-spouse.

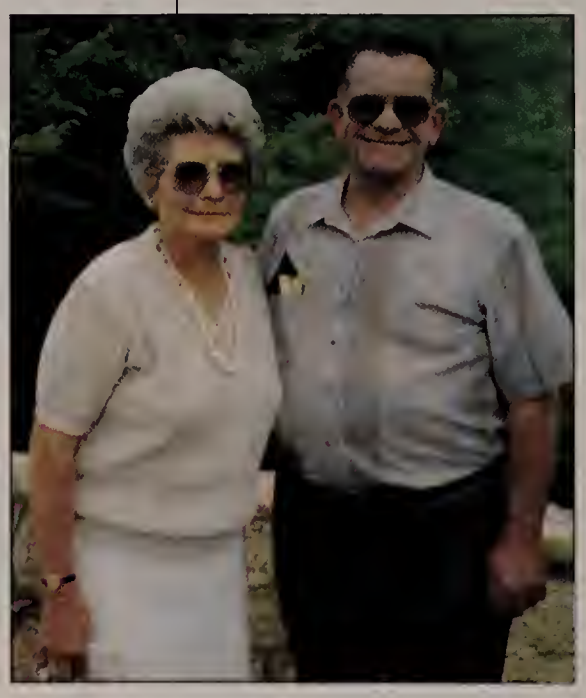
Take Two, a start-up photo shop in Arlington, Mass., offers a palliative to the camera's brutal honesty. With the help of computer imaging, the company allows customers to indulge in a kind of photographic revisionism that goes way beyond airbrushing.

◀ BEFORE

▼ AFTER

◀ BEFORE

AFTER ▶



A large part of Take Two's business is restoring old and damaged photos, which the imaging system makes possible at a fraction of the usual cost. But the company will also remove warts and unwanted relatives, substitute new husbands for old—even perform the occasional head transplant.

"Divorce has been really good for us," said Lynn Bryant, one of the owners of Take Two. (The business was founded by four women, three of whom are married to MIT frat brothers. Bryant, who has 15 years of experience as a financial-systems analyst, is the only one with prior computer experience.) "People spend a lot of money having their weddings photographed; then time passes and there's someone you want to get rid of. Sometimes it's the bride or groom, although more often it's the maid of honor's husband."

Take Two will also add figures to a photograph ("the brother who was overseas at the time of the wedding") or combine elements of two pictures ("if you want a picture of your great-grandmother and great-grandfather together, but all you have are separate photos").

And for those feeling photographically unflattered, Take Two's services are a lot cheaper than cosmetic surgery. "We've done some pimple removal," Bryant said. "And one woman has called us about taking off some poundage—but she hasn't come in yet." ■

PHOTOS COURTESY OF TAKE TWO PHOTOCRAFT

ALL THAT GLITTERS

"**DIGERATI,** *n.pl: people highly skilled in the processing and manipulation of digital information; wealthy or scholarly techno-nerds.*"

That definition appeared in a recent *New York Times* column, credited by word pundit William Safire to *Times* editor Tim Race.

"*Literati*," Safire explains, "Italian for the Latin *litterati*, 'learned,' means 'the intellectual set.' In the late 1930s, a portmanteau word was formed to blend the world of glittering celebrities with these intellectuals: *glitterati*.

"Now all that glitters is 'digital,' from the Latin for 'finger,' and later applied to a number that can be counted on the 10 fingers. Hence, *digerati*, 'computer intellectuals,' a word sure to flash through the world's electronic mailboxes."

CIOs have reason to revel in this coinage. After all, if anyone qualifies as true members of the digerati it must surely be the powerful elite who sit on high (or nearly on high), controlling the world's information systems. Congratulations to our readers, and welcome to the ranks of the beautiful people. ■

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Fastest benchmark on an IBM-compatible mainframe: 416 tps -Codd & Date

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TRENDLINES

QUALITY SURVEY

IT PAYS TO PLEASE

From the corporate level to the personal level, it seems that attention to quality really does pay. A recent study from Handy HRM Corp., a New York-based executive-search and -compensation consulting firm, in conjunction with the American Society for Quality Control, has found that quality may be *the* management issue of the '90s, crucial to ensuring customer allegiance and business survival.

"The use of quality measures in connection with compensation should increase markedly in the immediate future," said J. Gerald Simmons, president of Handy.

(Respondents to "the first comprehensive survey on quality-based compensation trends" included 78 of the nation's largest corporations, with representatives from virtually every manufacturing and service industry, as well as many past Baldrige Award winners.)

Among the most significant findings of the study: 54 percent of respondents already tie employee salaries, incentives and rewards to quality measures such as customer satisfaction, reduction in cycle time and prevention of defects. And 91 percent plan to base remuneration on customer-satisfaction measures rather than on such traditional financial measures as revenue growth, profitability and cost management.

The survey also showed 83 percent of respondents moving toward the formation of self-directed work teams to improve quality and customer satisfaction; 92 percent planning to require intensive, personal participation by top management in quality improvement; and 22 percent considering basing performance appraisals on feedback from other team members instead of supervisors.

The top five values guiding the respondents' quality-based compensation programs were: to meet or exceed customer expectations; to be the best in the industry; to continuously improve products and services; to empower employees; and to do what is right for the community and environment.

TODAY, THE OLYMPICS ...

For those who suspect that EDS will one day be running our soon-to-be-outsourced world, this summer's Olympic Games in Barcelona will do nothing to dampen such speculation. EDS will be trading in the ultimate ROI of Olympic competition: its computed results—who ran or swam the fastest, jumped or vaulted the highest or farthest. And so forth. Instantaneously.

This is apparently not such an easy thing to do. Consider that there are 34 sports venues in and around Barcelona, each creating a steady stream of data that must be reported both locally and centrally—in Spanish, English, French and Catalan (Barcelona's regional dialect). Moreover, EDS had to join its system to an already-contracted-for hardware infrastructure.

EDS's Results Information System includes 50 stand-alone LANs, 1,400 workstations, and numerous technologies and network connections to more than 2,200 local sites. The system will rely on a mixture of automated timing and measuring systems (including touch panels, video, infrared beams and meteorological gizmos); manual data entry (by as many as 2,000 volunteers); and keypads used by Olympic judges to enter scores.

In addition to competition results, the system will also provide or offer access to scheduling information, world and Olympic record statistics, athletes' bios, start lists and weather data. The system is now fully operational and in use at various Olympic trials.

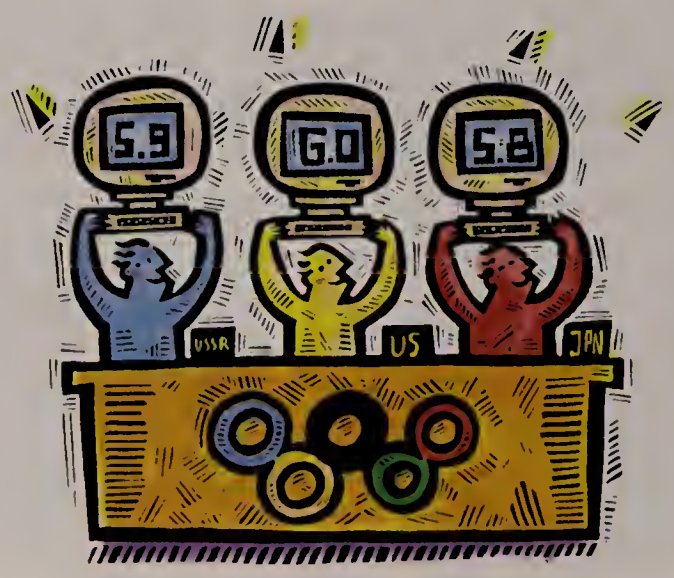

ILLUSTRATION BY FRAN O'NEILL

The Olympic contract is worth $22 million, with a further $6 million of value-in-kind in the form of an official Olympic sponsorship. EDS also has contracts with the U.S., British and Belgian national Olympic committees to provide Games-related technology services.

NEW VENTURES

In an effort to stamp out the security-unconscious, an assortment of technology vendors, user companies and other organizations have coalesced to form the International Information Security Foundation. Its charter will be to encourage and facilitate the inclusion of security features in computer systems, educate the public about the risks of insecure computer use, and advocate responsible use and management of computing resources. Among the founding members are American Express, AT&T, Bellcore, CBEMA, DEC, HP, IBM, the Information Systems Security Association, Morgan Stanley, Procter & Gamble and X/Open.

Price Waterhouse has inaugurated a management consulting practice to address the IS needs of multinational corporations competing in global markets. The practice will be headed by Mark D. Lutchen, a New York–based partner with 18 years of experience serving multinational clients. The practice will focus on developing and implementing transnational business ventures and IT-based strategies.

Motorola Inc. and Northern Telecom recently formed a joint venture to sell and service cellular telephone networks throughout North and South America and the Caribbean. Initially Motorola-Nortel Communications will jointly market the two parent firms' product lines. Eventually a unified product line will emerge from the new organization, which will be headquartered in Chicago and employ a staff of more than 900.

"An Architecture Of Possibilities Is Rooted In The Constant Of Change."

Richard Rogers,
Architect

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TRENDLINES

Career Moves

PATRICIA M. WALLINGTON, a Xerox Corp. vice president and CIO for the company's U.S. Marketing Group, has been named vice president of corporate information management. Wallington succeeds PATRICIA C. (TOSH) BARRON, who has been named president of the newly created Office Document Products division.

MONTE E. FORD has joined Bank of Boston as director of information services, a unit of the bank's Technology and Operations Group. Ford will manage, direct and market end-user technology for the corporation and its subsidiaries. He heads a staff of 85 and reports to Michael Simmons, executive vice president and head of Technology and Operations.

JERRY D. HAVEMANN has been appointed general manager for the information systems department of Heinz U.S.A. in Pittsburgh, a division of the H.J. Heinz Co. He will be responsible for IS strategic and tactical planning, application development, data processing and data and voice communications.

ELECTRONIC TRANSACTIONS

Speeding Speeding Fines

Talk about adding insult to injury. As if getting cited by California Highway's Finest isn't bad enough, traffic violators often have to queue for an hour at the local courthouse just to pay their fines. For motorists in Los Angeles County, technology is taking some of the sting out of paying fines by making the process as convenient as using an ATM.

The county is installing AutoClerk kiosks in an attempt to reduce costs and improve customer service throughout the court system. The kiosks, which are being beta-tested outside the county courthouse in Long Beach, are equipped with a PC, modem, printer and credit-card swipe. People can avoid the lines inside the courthouse and pay their fines quickly with a credit card. Like an ATM, the kiosk screen prompts users through their transactions, which average less than two minutes.

Currently AutoClerk enables the payment of traffic and parking tickets. Eventually any vehicle-related transaction normally handled by clerks will be processed by AutoClerk.

Plans are also in the works to install kiosks throughout the county and perhaps expand the service to include other types of transactions, such as property-tax payment.

"Hopefully [the kiosks] will be expanded to accept all kinds of fees for criminal and civil matters as well as [to perform] sophisticated bail recalculations," said Jim Weaver, court administrator for the Long Beach Municipal Court.

In addition, people at the Los Angeles Municipal Court will be able to pay their fines via touch-tone phones through an application that utilizes a voice response unit.

Both the AutoClerk and VRU applications are supported by TYMNET technology from BT North America Inc. of San Jose, Calif.

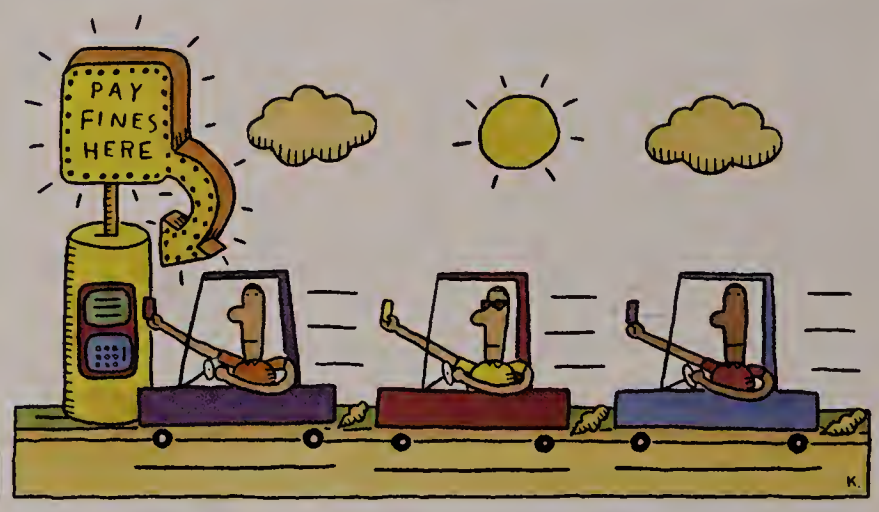

ILLUSTRATION BY JAMES KACZMAN

Career Bad Moves

Former Milliken & Co. CIO John Gieser has pleaded guilty to seven counts of mail fraud in federal court in Greenville, S.C. The Spartanburg (S.C.) Herald-Journal reported that Gieser defrauded Milliken, a large textile firm (see "The Fabric of Quality," CIO, August 1991), out of $94,532 by submitting bogus invoices for fictitious computer-related contract consulting services.

The newspaper, citing Assistant U.S. Attorney Matt Hawley, reported that Gieser was a part owner of a restaurant holding company. When the restaurant failed, Gieser bought out his partners, changed the company's name to HGH Services Inc., and used it as a billing name for the phony services. Between October 1990 and July 1991, Gieser submitted seven invoices to Milliken and had the checks sent to a post office box.

"Nobody ever questioned it," the article quoted Hawley. As of press time, Gieser was awaiting sentencing.

More Reasons to Stay Home

The ability to access information and entertainment at the push of a button is gaining appeal among Americans, according to a survey conducted for Northern Telecom and BellSouth by PG Research of Raleigh, N.C.

The capability, known as video dial tone, uses fiber-optic cable, digital switching and hyper-speed computing to transmit huge volumes of electronic information to consumers' homes in digital form over fiber-optic telephone lines. According to Northern Telecom, video dial tone will create a $30 billion electronic information-services industry by the year 2000.

Video dial tone makes it possible to transmit full-motion video, image, text and voice directly into the home. Services include movies on demand (within 15 to 30 minutes after ordering), delayed-view television, interactive news and music, interactive grocery and catalog shopping, electronic classrooms and multimedia libraries. Of the 800 respondents to the survey, about 70 percent said they would be willing to spend money on some or all of the new services as they become available.

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TRENDLINES

INFORMATION MANAGEMENT

THE JAPANESE EXAMPLE

While many Japanese business practices have failed to survive translation into U.S. usage, Far Eastern attitudes and approaches to managing information repositories might be more easily interpretable by American companies. That's the conclusion of a recent Ernst & Young consulting group study, which reported on information management at several Japanese industrial giants.

Japanese firms are preoccupied with the actions of their competitors and furiously collect external information on them. The repositories that hold this data grow to enormous proportions and require skillful information management. The relevance for American companies will grow as our economy becomes more globally competitive and management's appetite for externally generated information increases. According to the study's author, Boston-based Laurence Prusak, U.S. firms might draw inspiration from the following Japanese practices and attitudes associated with managing corporate data libraries.

- Japanese firms place tremendous value on information and, unlike their American peers, do not feel the need to justify information management expenditures. Information management is perceived as an essential cost of doing business.
- Business data is evaluated and presented in context rather than in a vacuum. When studying a competitor's sales data, for example, Japanese managers take into account historical and environmental circumstances that may have had an impact on the numbers.
- The mission of the information management function is closely aligned with the strategic thrust of the organization. Many U.S. IS departments are still struggling to master the language of business values and strategies.
- Technology is seen as an enabler for information management, not as the primary component. IT's responsibility is often limited to storing and cataloging repository data rather than manipulating it. (Even in large Japanese firms, the primary means of information distribution remains the printed page.)
- Management of the information function is rotated among all company managers. The tenure of an information department's manager is generally from three to five years. This allows managers to learn firsthand how the information is used and valued and to understand the economics of providing and distributing data.

While many U.S. companies remain narrowly focused on technology, the hope is that firms will refocus their energies toward the information itself and how it is best managed for competitive success. Then, said Prusak, perhaps something from the Japanese information-management lexicon may translate into sound U.S. business attitudes and practices.

SMILE WHEN YOU SAY 'HACKER'

Timothy Swenson, the editor of a newsletter called *QL Hacker's Journal*, wrote in taking us to task for misusing the term "hacker" in our February issue (see "Cyberspace Cadets"). We used the term in an all-encompassing way to describe acts of computer adventurism that ranged from curious experimentation to whimsical mischief, vandalism and, finally, outright felony.

According to Swenson, our overbroad use of the term besmirched the innocent activities of genuine hackers, defined as gifted programmers whose skill and persistence overcome their lack of quality software tools. Swenson included a glossary (attributed to one Michael McClary) so that, next time, we'll know how to characterize properly the shades of cyberspace activity:

- **A computer CRACKER is a person who defeats system security measures, sometimes legitimately (to test security or to hone programming skills), but more often to obtain unauthorized system access.**
- **A computer VANDAL uses his/her computer access, however obtained, to damage other people's data, programs or computer access.**
- **A computer PIRATE obtains improper financial rewards for someone else's data or programs.**

Said Swenson: "Saying 'hacker' when you mean 'cracker,' 'vandal' or 'pirate' is like saying 'cowboy' when you mean 'cattle rustler.' "

THE QUICK FIX

Enterprise reengineering can be bad for your company's health, according to the management consulting group at Gateway Information Services in New York. "Enterprise-level reengineering, as practiced today, requires too long a planning horizon, an enormous dollar investment and a significant disruption in operations," according to Ray Manganelli, Gateway president and CEO. While reengineering is crucial to many organizations' survival, he said, it only "makes sense when it is rapidly applied and executed. When it takes three to five years, it is potentially disastrous."

Gateway advocates a modular approach it calls rapid reengineering, seeking shorter-term solutions with a one-year return on investment. This is accomplished by rapidly identifying high-opportunity areas for improvement; labeling each as either a short-, medium- or long-term initiative; and undertaking only those that can be accomplished within one year. "Operational and workflow redesign and the supporting system design changes that are conceived of as state-of-the-art in 1992 may be obsolete by the time they are completed in 1997," Manganelli said.

ILLUSTRATION BY FRAN O'NEILL

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Combating Complexity

Managers involved in business reengineering projects are learning that simple is not only elegant—it's also highly competitive

BY ROBERT M. RUBIN

Reengineering success stories have received considerable coverage recently, as companies report the benefits gained from a fundamental review of their business processes. Their examples have stirred the interest of many executives, who wonder how to structure such an effort and identify the targets to attack.

Naturally, the details of reengineering and quality efforts will vary by industry and company. But the shared goal underlying all such endeavors should be the establishment of an organizational structure that contains fewer elements and is easier to explain and understand than its predecessor. The basic philosophical approach is the industrial equivalent of Occam's Razor, enunciated by the 13th-century scholar: "What can be done with fewer is done in vain with more."

What follow are steps, with examples drawn from practice, that companies must take to make fundamental improvements. All are predicated on the principle that the less complex an organization and its processes, the more effective they will be.

ILLUSTRATION BY JEFF FARIA

First consider the key impediments to change. Generally, people resist change because they fear the unknown. Administrative processes are often poorly documented and understood, making it difficult to predict the impact of changing them. Managers, unsure of the consequences of altering fundamentally the way things are done, find it easier to ask for a computer system to automate the process.

Take the case of a major municipality that was considering a proposal for a $5 million purchasing system. The approval process had reached its final stages when the question arose why the database needed to be online with 80 terminals across the city. This "need" turned out to be the desire for rapid central review of requisitions, which could be achieved by changing procedures to decentralize authority. The system was not approved.

Businesses recognize the need to manage activities that fall under the purview of one department yet require the involvement of others. Normally, however, companies have no mechanism for identifying efficiencies and synergies that cross functional boundaries. Instead they rely on separate quality projects and reengineering efforts for each department: They focus on solving individual problems rather than finding a unifying principle. Processes that are inefficient, redundant or downright counterproductive may be overlooked unless they produce outright calamities.

What is worse, companies tend to focus on the symptoms rather than the cause of the disease. A large

manufacturer, for example, required managers to sign six duplicate cards when authorizing a subordinate to spend money. A great cry arose for a computer system that would eliminate manual duplication. All that concerned managers was making easier the chore of signing six cards; they never asked why six different departments needed to check signature authority in the first place.

Executives wishing to avoid this kind of narrow, misplaced focus must put together a strategy for identifying the best opportunities for change and deciding who will evaluate and recommend alternatives to existing processes. Frequently businesses will hire external consultants to conduct these activities, seeking a fresh perspective. The tradeoff, however, is that staff buy-in is more readily achieved when employees are involved in identifying targets for change.

Team Simplification

A better solution is to establish a process-simplification team, composed of from three to five senior managers, that reports to the highest-level management group in the company. For example, at one major chemical company, this team consists of four senior officers who report to the seven-member executive committee (chaired by the CEO).

Evaluating and recommending alternatives to existing processes can turn into a mine field. One way to defuse conflicts and speed up the process is by charging departments with reviewing the processes familiar to each. Departmental representatives should act as facilitators/mentors to the teams responsible for process redesign and implementation.

Linkage between activities of the process-simplification team and any existing quality efforts is key. For example, team members should participate in decisions made by the company's quality steering committee.

Finally, picking the correct authorization procedure is critical because of bureaucratic resistance to change. If advocates of process simplification are forced to prove their case, they are unlikely to receive a speedy approval. But if the burden of proof is placed on affected groups that must convincingly justify their reluctance to change, the process is more likely to be expedited.

Managers, unsure of the consequences of altering the way things are done, find it easier to ask for a computer system to automate the process.

The Right Targets

Organizational simplification efforts must be highly publicized and receive full backing from the company's most powerful executives. Early results will be closely watched by employees and management alike. Positive, unambiguous results will send a message to the entire company. The process-simplification team can ensure that its initial projects will produce such results by choosing its subjects wisely. For its early efforts, the team should focus on clearly dysfunctional processes, choosing simple problems with solutions that can be implemented quickly and that produce easily measured results.

Rapidly correcting situations that irritate the average employee is important. Even if the bottom-line impact is small, a well-publicized solution to a well-recognized problem will promote confidence and enthusiasm, which will create momentum and make the simplification thrust real in the eyes of the company.

Executives at a multibillion-dollar oil company made the wise decision to kick off the simplification process by eliminating a chore that many employees found irksome. They scrapped a cumbersome procedure requiring employees to fill out requisition forms for all office supplies and get them approved by the purchasing department, and replaced it with a procedure that enabled employees to order supplies directly from selected vendors. Needless to say, the response was enthusiastic.

Keys to Success

It was stated earlier that one of the principal impediments to change is that administrative processes are neither well-documented nor well-understood. You can't fix a car unless you understand how it works, and the best way to learn is to ask someone who knows. Similarly, fledgling business-process mechanics must question the premises that underlie existing processes. Senior-level staff should lead the way, since many of those responsible for existing policy will likely prove defensive or impatient with what they consider obvious questions. An overview of existing processes should be prepared, but too much effort on such a project may waste time and compromise creativity.

Finally, do not wait for the ultimate solution; in many cases no such thing exists. If a proposed change corrects 80 percent of a recognized problem, adopt it and move on.

Compare the strategies of two chemical companies that wanted to reduce the time for their monthly closes. One is spending $3 million to replace its accounting software; that should reduce the time from 12 days to nine within the next two years. A competitor, wanting to cut its financial close down from 10 days, focused instead on organizational simplicity: The company quickly outlined its existing process and debated whether it could be completed using fewer steps. What followed were a few minor computer changes and a major rethinking of the process. Two months later the company had shaved two days off the process; within five months it expects to have cut closing time by half.

Even when handled carefully, the steps required to simplify organizational processes can be emotionally wrenching to employees and potentially disruptive to customers. But complexity is the enemy of competitiveness. Companies are taking a huge risk if business conditions change, and they do not. CIO

Robert M. Rubin is vice president of information services at Elf Atochem North America, in Philadelphia.

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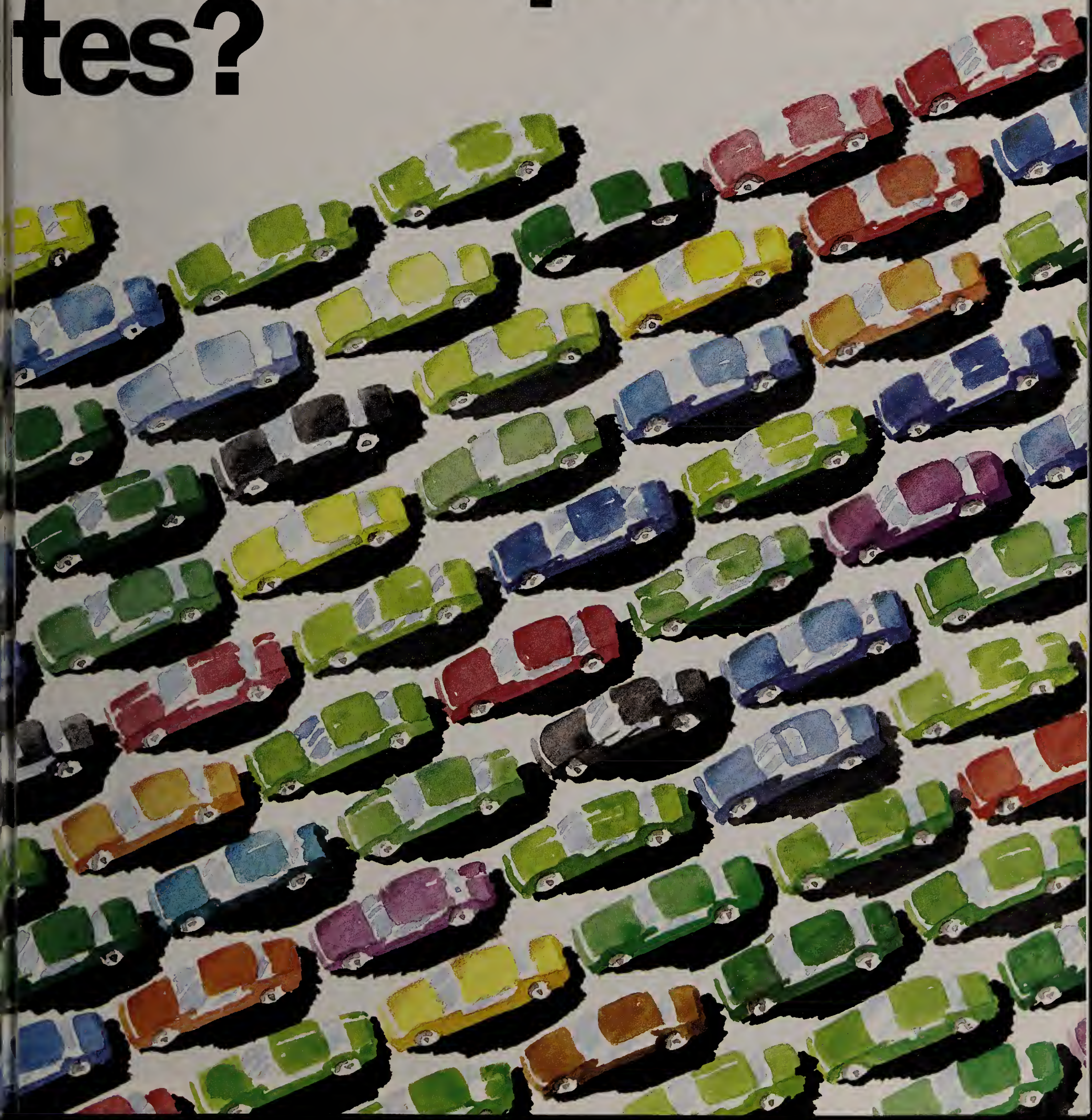


THE PERILS OF POWER

BY THOMAS KIELY

THE WORD "EMPOWERMENT" SHOULD BE STITCHED onto a yellow caution flag and waved in every workplace in the nation.

There is nothing wrong with the concept of empowerment. The word itself is low-rent psychobabble, but it is a noble sentiment. In theory, empowered employees are given the authority to make decisions that affect their work and to participate in the larger decisions that affect the entire organization. Champions of empowerment argue that the benefits accruing to the self-managed workplace are many: higher productivity, higher quality, faster product development, better human relations, more accurate knowledge of business processes or customers, and streamlined operations.

But the transition from a traditionally organized workplace to a self-managed shop must be handled with extraordinary care, say consultants and companies in the throes of the passage. If empowerment is mismanaged, it will fail, according to Thomas Kuczmarski, president of Kuczmarski & Associates, a Chicago-based innovation consultancy. He warned that a botched attempt to empower workers "is not just a lost opportunity; it can inflict a real wound on an organization." Other consultants add that failure is far more common than success in the touchy-feely realm of empowerment.

> Worker empowerment is the noble goal of crusaders for a productive, harmonious workplace. But unless their efforts are wholehearted and sincere, managers may inflict some serious damage on their organizations.

One reason for failure stems from management's justifiable confusion over the definition of the word. Based on surveys conducted by the University of Southern California in 1990 (building upon surveys conducted two years earlier by the General Accounting Office), about 80 percent of all Fortune 1,000 companies experiment with employee-involvement (EI) programs. These programs include simple employee-attitude surveys, quality circles, worker-participation committees and development teams. Typically, participation in the employee-involvement programs is limited to less than 40 percent of

ILLUSTRATION BY NICHOLAS WILTON

Middle managers have the most to lose. They are the ones most likely to have their roles changed significantly. A lot of attention has to be paid to them."

—Madeline Weiss

the company's staff, and the most-common manifestation of EI is a problem-solving team.

MANAGERS FREQUENTLY refer to all of this as empowerment, but true believers bristle at the confusion; they point out that the root of the word in question is power. Empowered teams—self-managed teams—have the authority to make decisions; they are collective managers, as it were. Teams without power are phony versions of the real thing.

But the real thing is as rare as certain gems, observed Edward Lawler, professor of management and director of the Center for Effective Organizations at the USC Graduate School of Business. "Many companies are dabbling in this, but not wholeheartedly," said Lawler, who has written a recent book on the topic.

Much of the touted empowerment underway in companies is smoke and mirrors: empowered teams with no real power. David Sirota, chairman of Sirota & Alper Associates, a New York-based management consulting firm that specializes in employee- and customer-attitude surveys, reports that employees of the dabblers view the changes as merely cosmetic. "A lot of this really doesn't work and just fades away," Sirota said.

"I go out to talk about empowerment [in companies with] existing teams, and team members just laugh," said James M. Dennis, managing director of Action Management Associates Inc., a Dallas-based consultancy. "It's not really empowerment at all if the culture stifles it. Empowerment [requires] fundamental organizational change, and you can't take care of that with training programs." Several consultants note that empowerment typically begins in a department or a unit within the corporation, but these experiments may eventually die an ignoble death if they remain isolated subcultures.

Another observer added that if manufacturing managers hope to eliminate a layer of supervisory management by devolving token power to the supervised, they will fail. "Real empowerment is when workers have rights to say how the work gets done," said John Stepp, a former deputy undersecretary of labor during the Reagan administration, currently senior associate with Bill Usery Associates Inc., a labor-relations consultancy in Washington. "If the principle is pay-out incentives—bonuses based on productivity—and workers have little say in how those formulas are arrived at and how the work gets done, is that empowerment? I wouldn't say so."

Some managers set up teams whose role is to "discover" a decision the manager has already privately made, noted Robert Johnston, a partner at IdeaScope, an innovation consultancy based in Cambridge, Mass. Often these teams will end up recommending a different course—then justifiably feel sandbagged when

Good Job! You're Fired!

When is a great teamwork success not a great success? When it so threatens the power, positions and perks of managers that the success gets buried, not replicated.

Consider the curiously solitary history of a General Foods manufacturing unit in Topeka, Kan. In 1971 a General Foods business manager, in need of more manufacturing capacity, designed and constructed a plant that was operated by self-directed work teams. The plant proved to be a highly efficient success—for everyone but the top managers who created it; they were

the manager sloughs off the alternative recommendation. Johnston has also witnessed a few instances where teams were set up deliberately to fail, and thereby to advance someone's covert political agenda.

It is dangerous to trifle with employee morale. "You can't let hope get out in front of what's being practiced," warned Ron Williams, manager of organizational planning and development at Pacific Gas & Electric Co., in San Francisco. The company has fostered a number of cross-functional teams, recruits and hires employees for teams, and is revamping human-resources policies and procedures (such as training or promoting staff) to reflect the new culture the company hopes to create. "If you allow workers to see what's happening as something other than what is actually happening, you will lose their trust."

Where empowerment has failed, you will hear a particularly bitter version of the blues. Sirota noted that recently empowered IS employees at a major financial-services firm have already decided that the program is bunk. Some of their work is done in teams, but the rules and culture governing the rest of their day in the old-line, bureaucratic firm are Dickensian. The contrast is jarring.

"Success or failure, whether [empowerment] works or not, depends on whether management gives it real or lip service," said consultant Kuczmarski. "This is the number-one issue."

EVEN WHEN IT WORKS, empowerment isn't easy. Sara Lee Knit Products in Winston Salem, N.C., now operates seven plants with

Employees are afraid they will screw up, or that they will have more authority but not more money, and they say, 'Who needs it?' "

—Brian Usilaner

soon forced out of the company. And General Foods, fearful of what it had wrought, tried to force this new monster to walk and talk like its more traditional counterparts.

The plant is still in operation (its present owner is The Quaker Oats Co. of Chicago). But 20 years ago it was a novel experiment. The new, essentially managerless operation "paid for itself in three to four years, and then kept going," said Edward Dulworth, one of the creators of the plant. "We produced 50 percent more out of the plant than we anticipated, in a growing business. It was a breakthrough. But we created big problems in the corporation."

Dulworth's former boss, Lyman Ketchum, the one-time General Foods operations manager who opened the Topeka plant, said the operation's success—which required managers to give up power—aroused "a jumble of emotions in managers, including envy, misunderstanding and fear." Mostly fear: The success of the plant called into question traditional management and labor-relations practices. Dulworth remembers hearing corporate cynics refer to the plant's boosters as a communist cell.

"General Foods would have liked to kill the organization," recalled Bob Mech, another of the unit's creators. "I think we were partly to blame for the problems. As a leadership group, we were young and proud of the success we had achieved. We were pretty cocky." Soon Ketchum left to consult; Mech sought another job (and today is up to his old empowerment tricks as manager of retail food at The Clorox Co. in Oakland, Calif.). Dulworth was fired. His replacement as plant manager, Herman R. Simon, recalled that his charge from General Foods was to "sit on the plant." Ketchum says that Simon's former boss—Ketchum's colleague in General Foods—intended to force the plant to "conform" to the General Foods mold, but failed, since it would have meant an entire redesign of operations.

So Topeka survived. "We want to continue to do well," said Simon, who still holds the general manager spot. "We've slipped a little, and we want to fix that, but the main structure of this place will not greatly change."

—T. Kiely

A botched attempt to empower workers "is not just a lost opportunity; it can inflict a real wound on an organization."

—Thomas Kuczmarski

a team approach and is gradually prodding the teams to become self-managed. "This is a tough thing to do," said Tyler Cole, vice president of T-shirt operations. Employees who once labored in a push-through batch-manufacturing operation now work in teams composed of from nine to 12 people performing eight functions, from assembly to inspection and packaging. The company replaced individual incentives with others based on teamwork. Employees received substantial training in teamwork skills and conflict resolution.

Initially managers and employees alike were euphoric, according to Cole. And the benefits they had anticipated came very quickly: reduced administrative costs, faster throughput, quality improvements, terrific flexibility. "But then we hit some culture problems," Cole said. Some employees have balked at the team-based incentives; others are resisting the responsibilities of self-management. "We're blazing new trails here," Cole said, "but it's certainly not easy. This is a two- to five-year process."

Managers hell-bent on pioneering this new terrain must learn to cede power and to trust their staffs. That is a scary prospect for many managers, but especially for middle managers. "They have the most to lose," explained Madeline Weiss, president of Weiss Associates Inc., a management consulting firm based in Bethesda, Md. "They are the ones most likely to have their roles changed significantly. A lot of attention has to be paid to them."

New United Motor Manufacturing Inc. (NUMMI), in Freemont, Calif. (a General Motors-Toyota joint venture), is an all-team plant at which newly hired managers undergo 14 weeks of training, including a lot of work in human relations, said Sheryl Greenberg, acting manager of training and development. NUMMI has marshalled its 3,000 plant workers into groups of about 30 people that are further subdivided into teams of from four to six employees. Each team and group has its own leader. Team members rotate jobs and participate in decisions about operations and work design. "This has been quite a change for traditional supervisors," Greenberg said.

PG&E's Williams agrees. "We had to spend a lot of time with these managers," he said. The measure of the difficulty PG&E and NUMMI face in this regard—and of how crucial supervisors' performance is to the overall success of an empowered culture—can be gleaned from comments offered by Bob Fernandez, secretary-treasurer of United Auto Workers Local 2244 at NUMMI.

"On the face of it, the team concept sounds great," Fernandez said. "It means working together, trying to solve problems at the earliest stage, a non-adversarial relationship with management, and being involved in decisions. But managers are screwing this up. Some managers are pretty good. Some work well with the teams. But some have the same mentality [they did] when they worked for Ford or GM. That's what screws this up."

As Sara Lee has discovered, employees too fear empowerment. Brian Usilaner, a senior vice president at Sirota & Alper, noted that em-

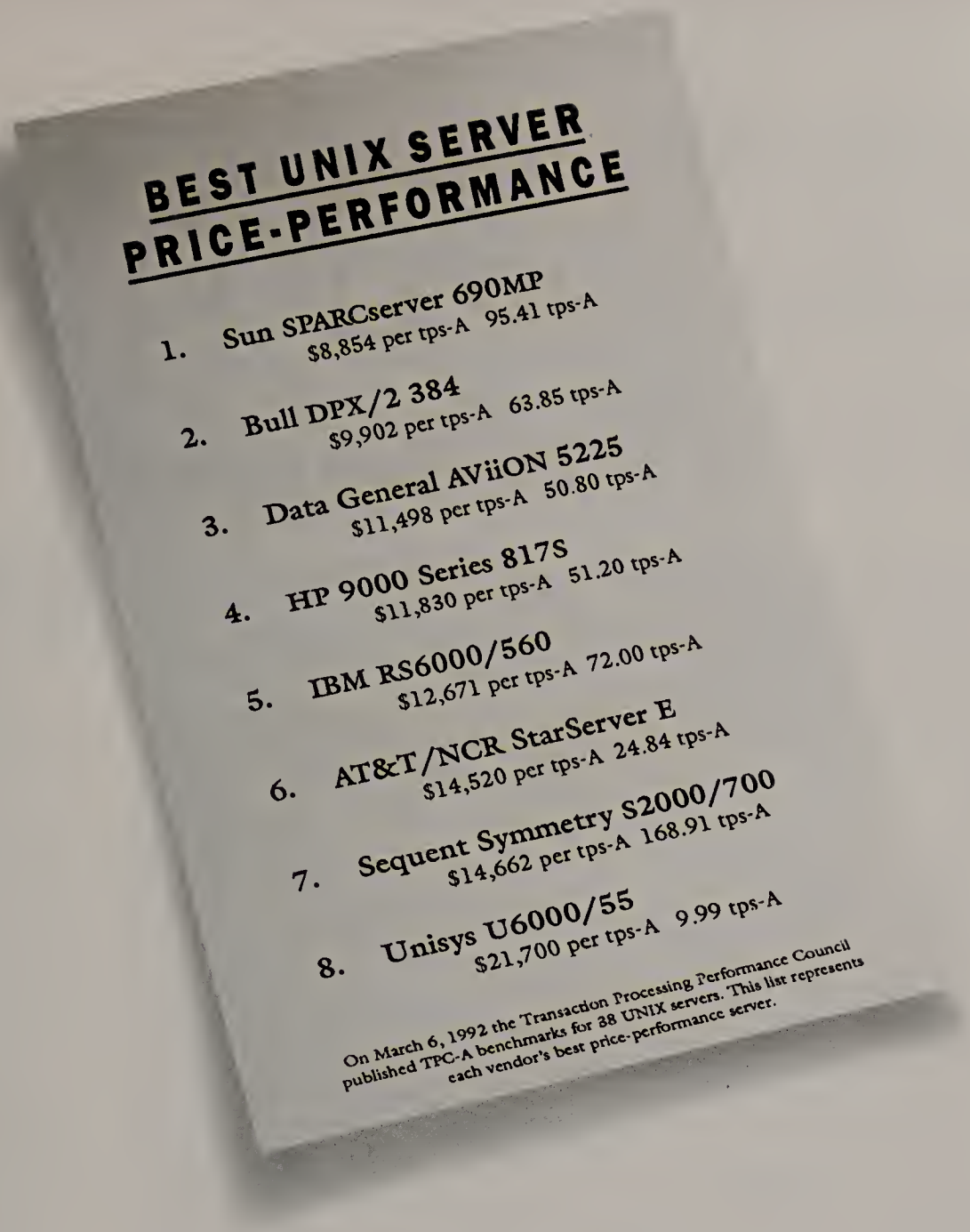
Power Pointers

IdeaScope's Robert Johnston recommends a few empowerment guidelines for the long haul

Empowered teams should know clearly what the organization expects of them, and the roles of individual team members should be well-defined: Who is the leader, for instance, and what does the organization expect of each member of the team?

Senior management must stand squarely behind the team. "It is critical to have someone who is one or two levels above the most-senior person on the team act as an organizational sponsor for the team itself," Johnston said. "This helps the team be certain that it is aligned with what senior management is thinking."

Team members should have access to the resources required for their success—whether that means support staff or just the time and space in which to work—and they should be allowed to venture beyond the corporate paradigms. For example, the team may want to include members from outside the corporation.



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The SPARCserver 690MP (left) is one of a family of powerful, affordable multiprocessor servers.

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ployees "are afraid they will screw up, or that they will have more authority but not more money, and they say, 'Who needs it?' " This attitude exists even in the most supportive of environments. In 1990, Usilaner surveyed employees in companies that have won (or nearly won) the Malcolm Baldrige quality award. In most of these companies, he noted, employees were disquieted by the responsibilities they acquired during the transformation.

Then there's the problem of hotshot employees who may feel constrained by teams. In NUMMI's IS department, employees work in teams in an officeless environment where the distinctions between systems analysts and programmers are blurred. IS employees "have lots of autonomy, lots of authority," said Jack Purdy, NUMMI's manager of information systems. "We only corral them if they stray too far. But this environment can be a problem for the person who wants to be a rising star. It is more difficult to rise quickly. Team effectiveness is more important than star quality. On the other hand, with the emphasis on teams, the weaker members are uplifted."

Many old-line union leaders also oppose empowerment as a threat to the union. Joseph Garcia is secretary-treasurer of UAW Local 645 at a General Motors plant in Van Nuys, Calif., where workers narrowly accepted a management plan to reorganize the assembly line into teams. "We opposed it because we saw it as a way to get rid of the union," said Garcia. "Management said, 'Problems will be worked out among us.' Why do you need a union, then? So we took opposition to it. We were looking at the long-term effect."

BUT SIGNING ON managers and employees is fruitless if the organization isn't tweaked to sustain them. Teams need to be embedded in the organization (they will wither if the executive gods are distant and silent) and provided with both the skills and the authority to make decisions. The culture must reward risk, or at least not punish failure. And promotion and compensation programs must reward the new values.

Hamilton Standard Commercial Aircraft Electronics Inc., in Colorado Springs, Colo., succeeded by building its self-managed corporation from the ground up. In the newly built plant, which began production in February, 250 workers are grouped into teams structured around product lines, with responsibility—and accountability—for their lines. "The work teams are essentially stand-alone profit-and-loss units," explained Jay Kirksey, director of human resources at Hamilton Standard. "They operate as entrepreneurial businesses." There are only five managers—and no supervisors—in the plant.

The plant was formerly located in Connecticut and employed 450 people. Managers did not feel they could accomplish a quick transformation to the new culture (which was prompted by its relationship to its largest customer, Boeing) with its existing unionized staff. The Colorado staff was culled from applicants who were extensively tested for their skills and their ability to work on teams.

"Empowerment in and of itself is risky, if not downright dangerous," warned Larry Osterwise, director of market-driven quality for IBM. (From 1984 until 1991, Osterwise headed up IBM's AS/400 operations in Rochester, Minn., as the division's 8,000 employees adopted empowerment.) "You can't just say, 'Here's empowerment, go have fun.' "

Training and communication—lots of both—are key to making empowerment work, Osterwise says. He advises would-be empowerers to clearly spell out the goals and values of self-management to all employees, and then infuse with liberal doses of education. (PG&E agrees: On any given workday, fully 5 percent of the company's workforce is participating in a training program.) For empowerment to take root and grow, Osterwise said, "it has to be preceded and accompanied by a lot of enablement—by that I mean giving people the skills they will need to succeed in this new environment." CIO

Teams need to be embedded in the organization and provided with both the skills and the authority to make decisions. The culture must reward risk, or at least not punish failure. And promotion and compensation programs must reward the new values.

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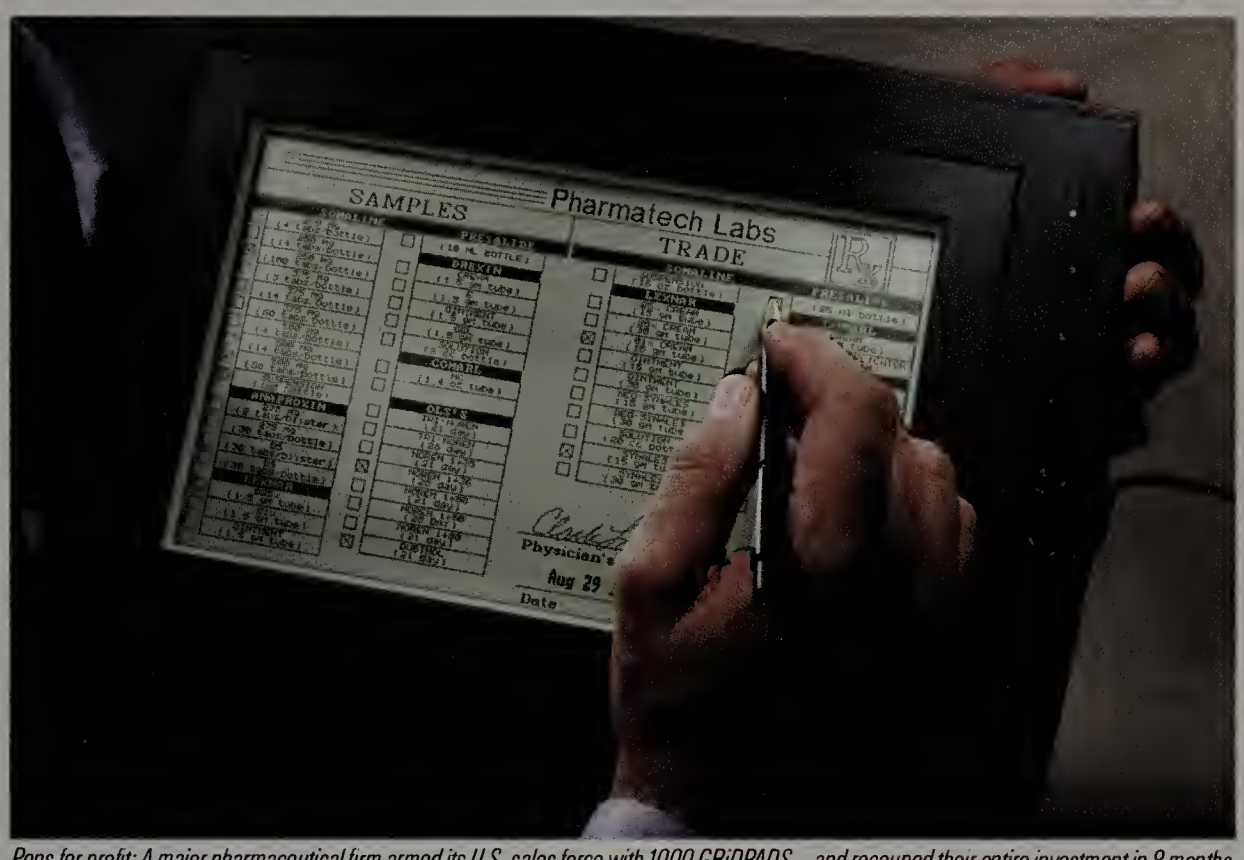

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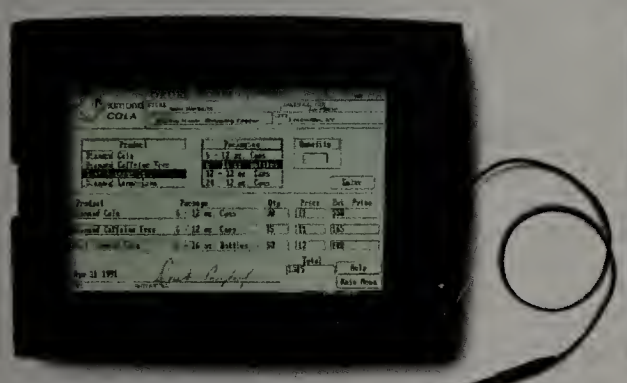

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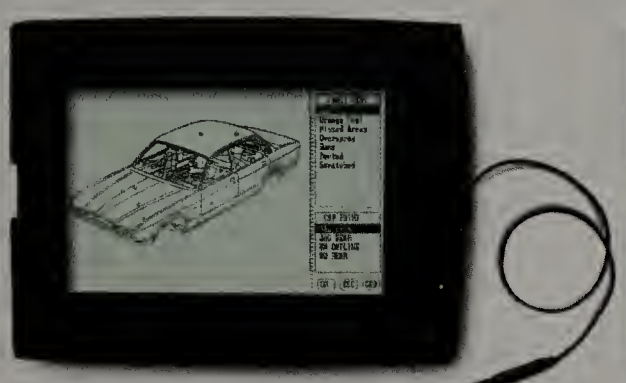

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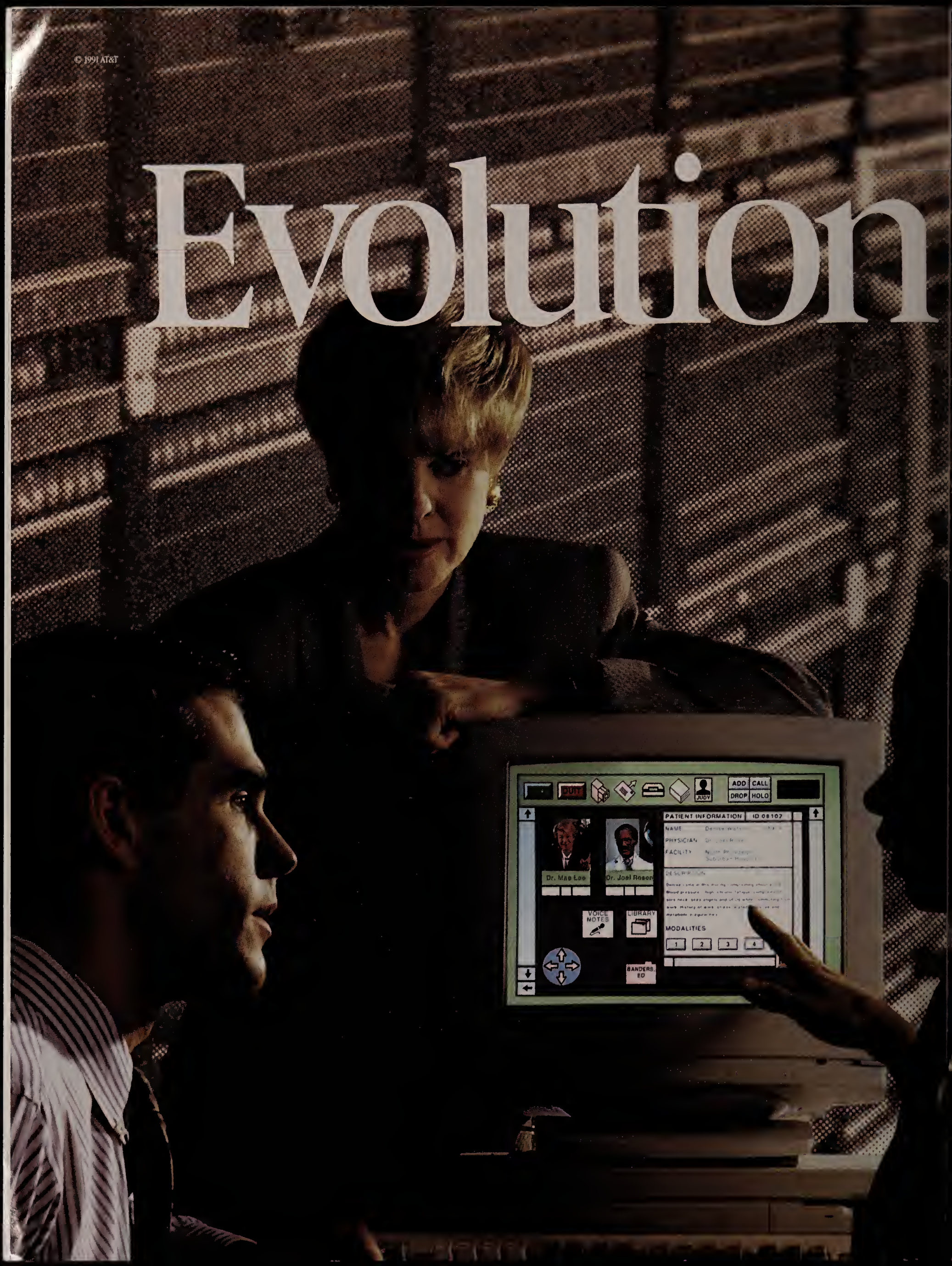

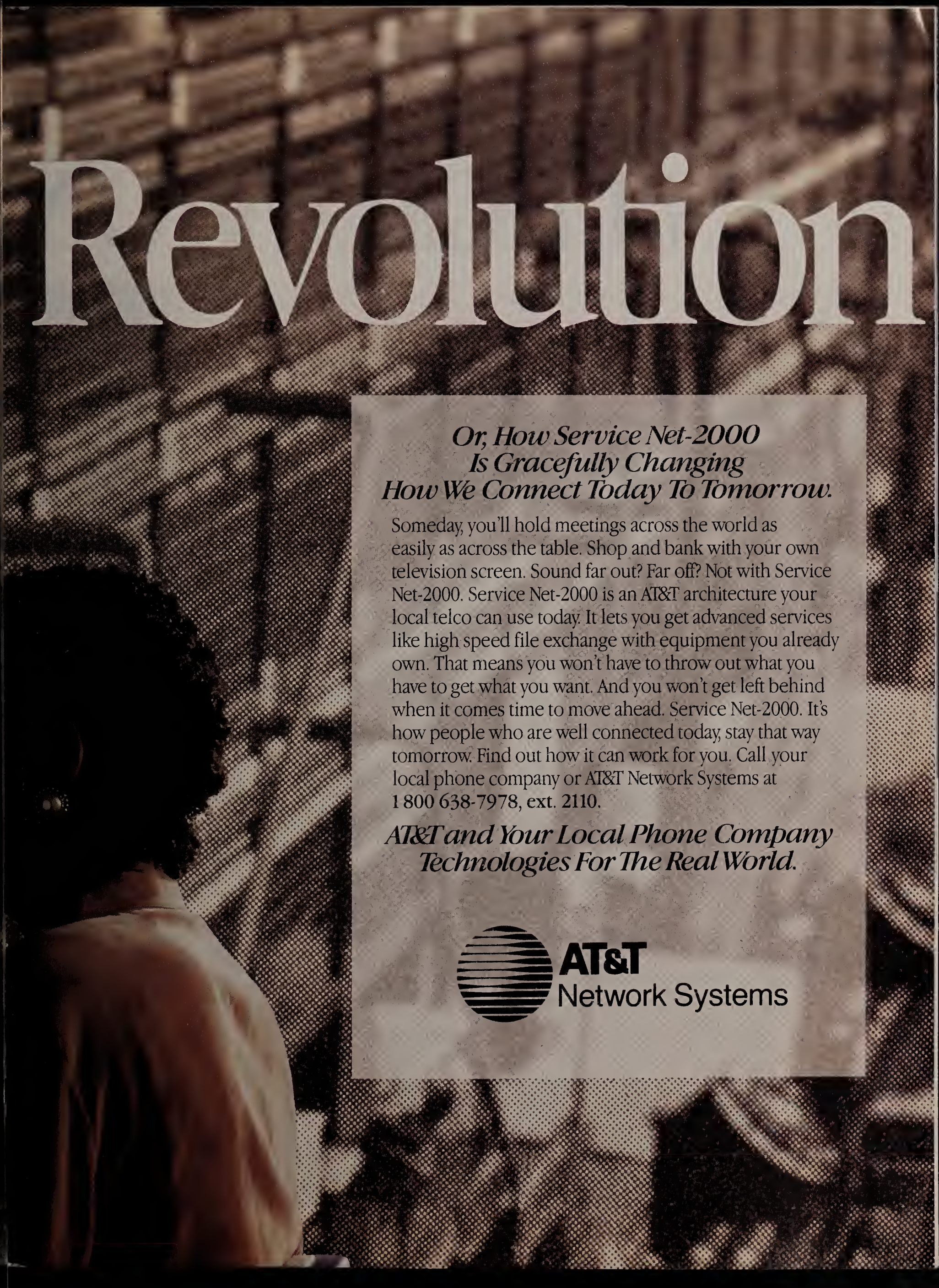

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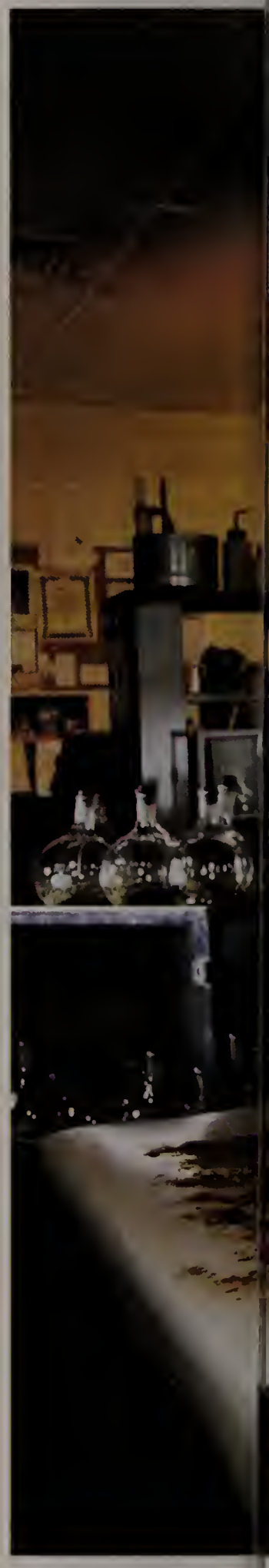
INTEGRATION

From superstores to boutiques, there are systems integrators to fit any company's needs and style. However, figuring out what to buy—or even where to shop in the first place—can be a daunting prospect. Managing the relationship is a challenge as well.

When systems integrators talk about their client offerings, they use phrases like "partnership," "solutions" and "business integration." When CIOs talk about third-party systems integration, they're more likely to speak of "knowledge transfer," "skill sets" and "technology expertise." The disparity is partially the result of marketing language sounding grander than reality. Part of the translation trouble, however, is that systems integrators are increasingly buying into the superstore concept of offering every systems service imaginable, while customers are primarily looking for a bag of nails, some specific advice and a do-it-yourself guide for the long haul.

The major systems-integration companies have grown from simple consultants or contract programmers into jacks-of-all-trades, able to draw on extensive resources to provide CIOs with almost any IS service they desire. Some have built vast empires of specialized units; some have entered into alliances with other firms in order to offer whatever expertise the customer wants. Third-party experts and dilettantes alike are working hard to keep customers happy and themselves busy.

CIOs who value the expertise and flexibility that systems integrators provide must sift through the sales pitches to find the services they need. And while many rely heavily on third parties to help implement strategic projects, they are, nevertheless, reluctant



JOHN P. THOMPSON: *Before McCormick & Co. signs a systems-integration contract, it first drives a hard bargain and checks out contenders' track records.*

FOR SALE

BY
MEGHAN O'LEARY

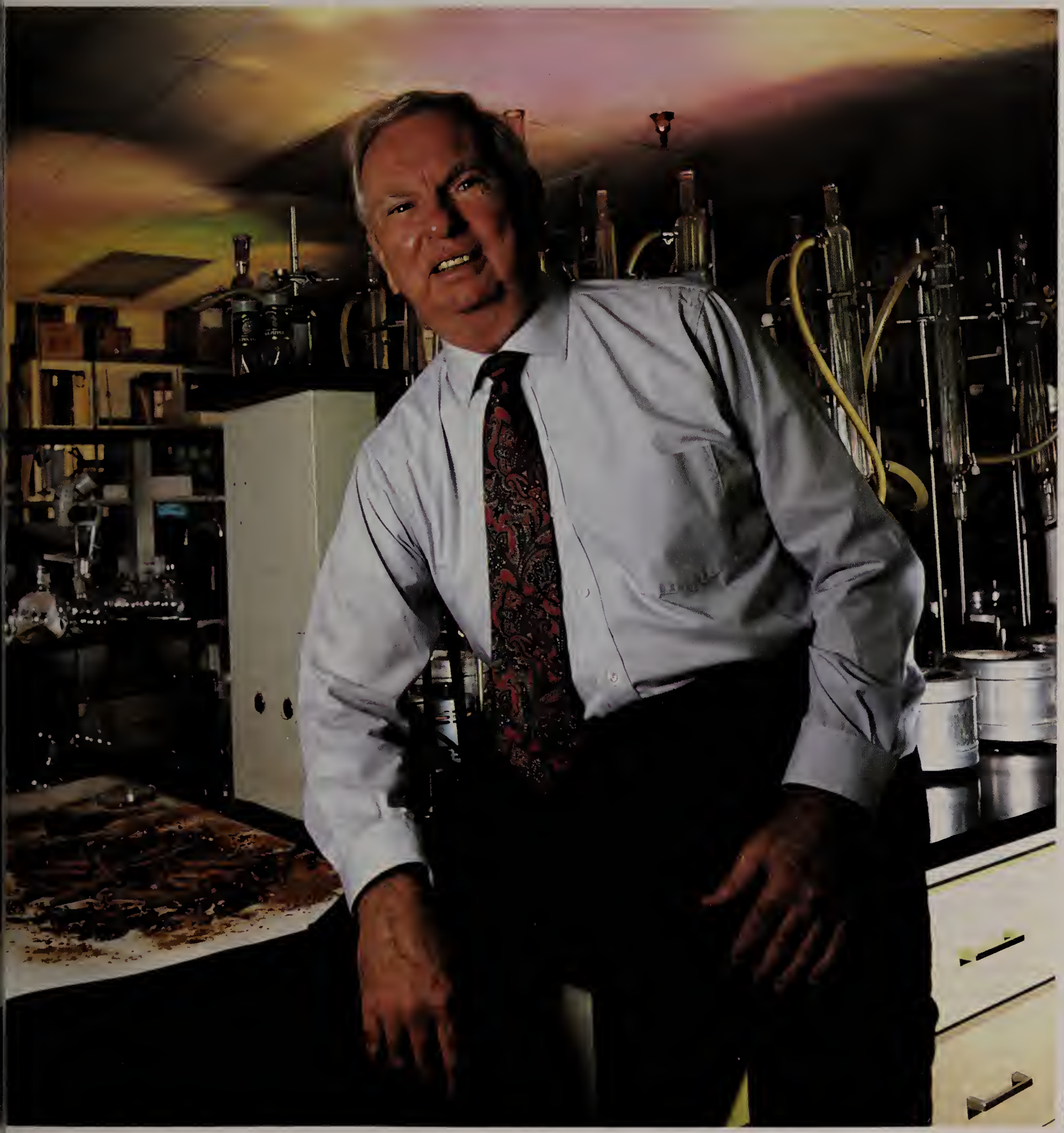


PHOTO BY MANUELLO PAGANELLI

LESSONS IN S.I. MANAGEMENT

- **Choose an integrator familiar with projects of the same type and size as yours. Familiarize yourself with your integrator's company and track record.**
- **Look for someone who knows your industry and can develop competitive systems.**
- **Insist on fixed-price contracts.**
- **Hire integrators on a monthly or yearly basis for many projects in order to get a better rate.**
- **Assign clear financial responsibility for problems and delays.**
- **Establish clear measures of success for every stage of the project.**
- **Have an outside auditor monitor the costs and procedures of the project.**
- **Familiarize your vendor with (preferably published) company standards and methodologies for project management and systems development.**
- **Work with a small number of suppliers over the long term in order to get them in sync with your business procedures and needs.**
- **Appoint a non-IS manager or a steering committee representing the functions affected by the project to keep it in line with the company's business needs. Hold functional managers as well as IS and third parties accountable for the success of the project.**
- **Build a strong internal systems-integration team that can lead the way on projects that require third-party integrators. Have third-party integrators train internal people thoroughly before they leave.**

—M. O'Leary

to surrender critical systems development and integration responsibility to an outsider, no matter how skilled. A troubled economy and stricter corporate ROI measures have halted the growth of many an IS budget. Increasing corporate competition has made every project time-sensitive. In order to work with SI vendors who, like kudzu, often expand to fill the time, space and budget available, CIOs have had to learn to manage those relationships without being smothered.

CIOs' approaches to managing third-party integrators—managing costs, allocating authority, assigning accountability and developing systems—range from the casual to the autocratic. "I have a saying," confided Neil Evans, general manager of the information technology group at Microsoft Corp. in Redmond, Wash. "You have to manage your supplier or they will manage you."

Perhaps the most important aspect of managing the client/integrator relationship is choosing the right integrator for the job. John P. Thompson, CIO and vice president of MIS at food-products company McCormick

In order to work with SI vendors who, like kudzu, often expand to fill the time, space and budget available, CIOs have had to learn to manage those relationships without being smothered.

& Co. Inc. in Sparks, Md., looks closely at integrators' past experience before signing any contracts. For a recent project to integrate process-control and administrative systems at the company's Dallas plant, technology-specific experience was particularly important, according to Thompson. "I didn't have anyone at the time who knew anything about

HFSI: S.I. BOOT CAMP

As any systems integrator will tell you, there is no substitute for hard experience. Cheryl Smith is building her own internal SI team, and she believes you can't start them too young. Smith, the director of IS at HFSI, a federal systems integrator in McLean, Va., regularly hires student interns from local colleges to learn new tools, techniques and platforms from her internal IS group. Once they have learned to build systems from cradle to grave internally, she turns them over to HFSI's consulting practice to ply their skills in other work environments. "Our group acts as a training ground for HFSI," she said.

Smith, a former consultant herself, has had such success with colleges that she has extended the program to a local high school. Interested juniors can work with HFSI's IS staff over the summer and then continue to report for half a day every week from September to January. When they finish in January, they must present a project based on their work to the school for a grade.

This past fall, a student from the school helped Smith's department implement the requirements for selecting an optical character reader and full-text-retrieval system for the company. The experience was so good that he plans to continue his involvement with HFSI as a college intern.

—M. O'Leary

process control for the bread-and-batter beating equipment," he said. So that became one of the criteria in selecting an integrator.

The Eastman Kodak Co. in Rochester, N.Y., maintains a list of recommended contractors that it knows are financially stable, have track records of equitable employee practices and reasonable turnover rates, and are willing to work as partners, according to August H. (Gus) Holderer, manager of customer support systems in the company's Worldwide Logistics Information Systems division. Such background checks allowed Holderer to focus on technical skills rather than corporate stability when choosing a small integrator to help him downsize two strategic customer-service applications to a client/server environment.

After choosing a contractor, CIOs must establish clear measures of success for the project and decide on courses of action in case the integrator doesn't meet the benchmarks. Roger G. Willis, a partner in the Products Industries division of Andersen Consulting in Chicago, suggests that users and consultants establish success measures for every stage of a project.

CHERYL SMITH: *Multiproject contracts can produce savings.*

Rick Hopfer, assistant vice president of current and emerging technologies at Hartford, Conn.-based Aetna Life and Casualty Co., explained that his company relies on its contract expertise to pin down deliverables and financial provisions in case an integrator falls short of its promises. And Willis has noticed a growing trend of users compensating integrators based on their performance.

McCormick's Thompson is a great believer in integrators earning their fees. He manages his contracting activity with an eye on the bottom line—negotiating contracts and using his own accountant. Like a growing number of CIOs, he also insists on fixed-price contracts. Kodak's Holderer sticks close to the company's consultant-pricing guidelines to keep his costs in line.

Other CIOs have looked for economies of scale. Cheryl Smith, director of IS at HFSI, a federal systems integrator in McLean, Va., has saved money by hiring one consultant for a number of projects over a long term rather than hiring several for short terms.

When it comes to cost accounting, CIOs know that there's no such thing as too much involvement. C. Roger Brooks, vice president of IS and CIO at Allied Van Lines Inc., in Naperville, Ill., professes to conduct an "almost hourly review of costs" being incurred by integrators who assist him with big projects. The review is merely a failsafe, however; systems integrators at Allied must have the CIO's approval on every expenditure before proceeding.

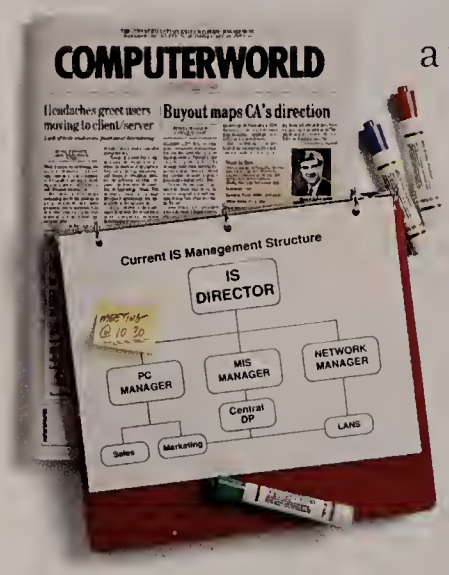
For many CIOs, control doesn't end at the purse strings. While some are content to develop projects based on the methodologies of their systems integrators, others, such as McCormick's Thompson, prefer to trust their own successful methodologies. Not only is Thompson comfortable with his structured walk-throughs, joint application design and prototyping, he is markedly reluctant to invest the time to learn a new methodology. "We looked at one ... that was like 18 binders," he said. "The project would have been delayed three

PHOTO BY MANUELLO PAGANELLI

If there were only one kind of computer buyer, we'd only have one computer publication.

These days, technology has to serve everybody. The trouble is, everyone wants technology to do something different.

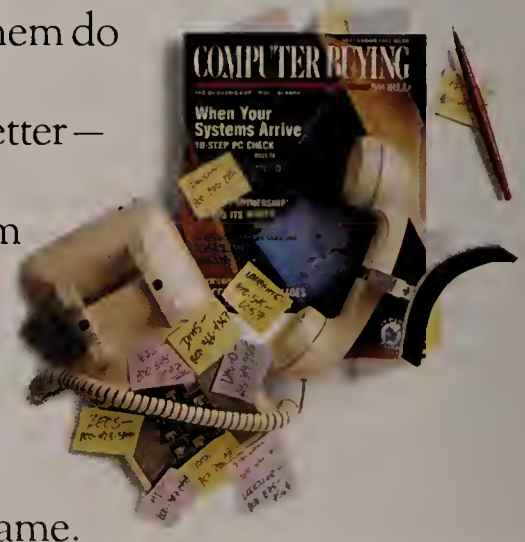
IS managers, for instance, are apt to put a very strategic spin on things. That's because they're charged with delivering information throughout the enterprise, integrating the company's computing and communications resources.

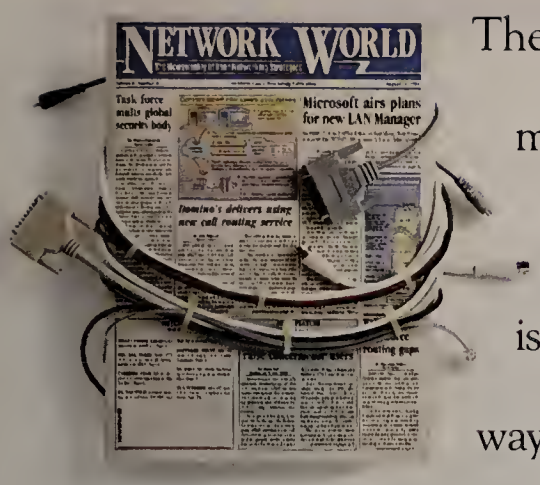


CIO's tend to look at the whole enterprise another way. After all, they're tackling some of the very trickiest issues in business. Like how to best use technology to produce the greatest business management gains.

Department managers, on the other hand, have to focus on doing just what their name implies. So they're more concerned with the productivity issues in their own backyard, their local area networks, and generally making sure their department is happy and humming along.

End users, however, have a different perspective entirely. They see the world from their desktop. They want whatever helps them do what they do better—while giving them access to the rest of the workgroup or a mainframe.





Then there's senior management. To them, technology is one of the best ways to gain a strategic, competitive advantage. Or, at least, it better be.

The point is, everybody's involved. All these groups influence each other. That's why, today, there's no one person who's responsible for buying technology for the many. Instead, in the

networked corporation, there is a network of people who are responsible for buying and implementing technology, each responding to different needs and demands.

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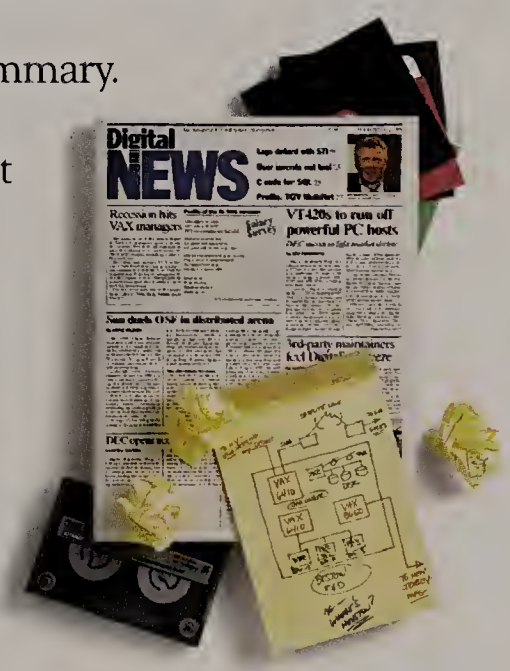

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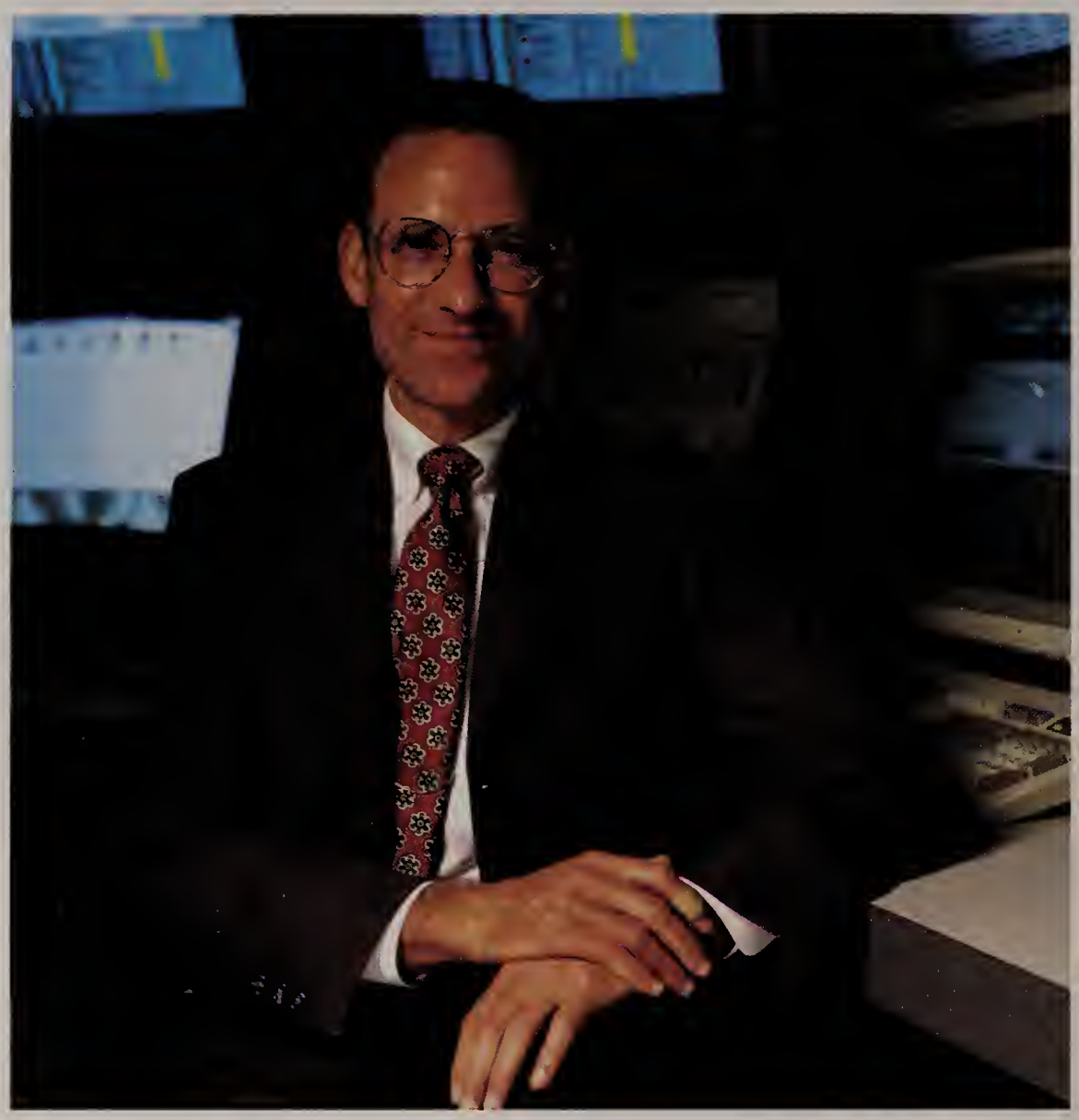

NEIL EVANS: *A case of manage or else be managed.*

weeks while everyone read the manuals."

BC Gas Inc. in Vancouver also likes to control the way its projects are approached. The utility's IS group greets new integrators with a 100-page project-management standards manual dealing with everything from procedures to documentation.

IS groups that insist on using their own methodologies generally want a high degree of project control as well. Most companies have some version of an internal project manager or a non-IS steering committee responsible for granting final approval and keeping the project in line with business objectives. CIOs often speak of the systems integrator as being part of their internal team.

Many vendors find that being part of a team rather than the leader of one is not a problem. In fact, the notion of partnership—that ideal of client/supplier relationships where everyone is working for the good of the project and no one gets bogged down in pesky hierarchies or economic opportunism—has become an effective marketing tool for vendors.

The Ties That Bind

By linking suppliers, manufacturers and distributors electronically, enterprise integration gets products to market faster

Systems integration within a corporation promises to help departments work together more efficiently and do business better. The Microelectronics and Computer Technology Corp. (MCC), a technology research consortium in Austin, Texas, is working with a handful of large American manufacturers and computer vendors to expand that idea to include integration across the many companies that participate in the making and selling of a single item such as an automobile or a personal computer. MCC calls it enterprise integration.

Roy A. Smith, executive director of MCC's Enterprise Integration division, likes to explain EI in terms of the Japanese concept of *keiretsu* (family)—strong vertical industry links between suppliers and manufacturers. He envisions a sort of "virtual *keiretsu*" in which the entire supply chain is linked electronically to allow products to get to market faster.

Some large manufacturers, such as GM and Boeing, are already doing this today. By setting integration architecture standards, EI would allow very small suppliers to make a single technology investment and be part of an electronic supply chain serving several big companies instead of just one. "If you could standardize at least some subset of that technology, you could immediately expand your supply base, and people within that base would become more competitive," Smith said.

If Smith has his numbers right, EI will make the manufacturing supply chain much more efficient. "We did an analysis of manufacturing [overall and found that] 40 percent of the information [—from order entry to billing—] is of the same type," he said. "Narrow it down to the industry and 70 percent is the same. Narrow it down to the same product and about 90 percent is common. But less than 10 percent of the infrastructure is the same."

—M. O'Leary

PHOTO BY RAYMOND GENDREAU

Like a growing number of CIOs, McCormick's Thompson insists on fixed-price contracts. Kodak's Holderer sticks close to the company's consultant-pricing guidelines to keep his costs in line.

Attitudes toward partnership range from the naive ("partnership should be like a close friendship") to the unyielding ("it's our project and it's our money").

The important thing about partnerships is that "you have to [specify] the grounds for divorce before you consummate the marriage," said John Frank, senior staff adviser of the Vienna, Va., branch of Input, a market-research firm. "Then there are no hard feelings, because there is recognition that if certain things don't work, the relationship dies."

Indeed, a good partnership is often the result of a good contract. Kodak's Holderer stressed that the synergies of partnership can fall flat without a contract assigning clear financial responsibilities for problems and delays.

Microsoft's Evans is openly skeptical about partnerships and believes that a contract is only as strong as the person who enforces it. "It's like training a dog," he said. "The dog will always try to push the limits until you teach him who's the boss." But even if he could train a contractor, Evans has little faith in that contractor's ability to keep the client company's objectives foremost in mind. "Consultants have two goals: One is to complete the project, and the other is to find the next project. You have to keep them focused."

Evans is not alone in believing that authority and direction for a project must come from within the corporation. More and more IS executives—Thompson, Smith and Evans among them—are focusing on developing strong internal SI teams who will gain enough experience in systems integration to be able to lead internal staffs and third-party experts with equal confidence.

As part of her team-building efforts, Smith draws up contractual agreements with her integrators providing "knowledge transfer" from vendor to staff as the last phase of any project. "If you have a commitment to having an internal staff, training is essential," she said.

Thompson approves of such precautions. "If it's knowledge we don't have, I want it to be transferred to my own people so we can maintain it," he said. "I do not do the typical meaning of systems integration where you define a project and [an outside contractor] comes in and does the whole thing and hands you the key. I'm always more comfortable with having control." CIO

Leading Systems Integrators By 1990 Revenues

COMPANY	LOCATION	REVENUES*
IBM Corp.	Armonk, N.Y	$1,548
Digital Equipment Corp.	Maynard, Mass.	1,100
Andersen Consulting	Chicago	891
Electronic Data Systems Corp. (EDS)	Dallas	889
Unisys Corp.	Blue Bell, Pa.	638
Computer Sciences Corp.	El Segundo, Calif.	612
Control Data Corp.	Minneapolis	591
Boeing Computer Services	Seattle	370
TRW Information Networks Program	Torrance, Calif.	350
Martin Marietta Corp.	Bethesda, Md.	300
SAIC	San Diego	274
Lockheed Corp.	Calabasas, Calif.	271
American Management Systems Inc.	Arlington, Va.	251
AT&T	New York	250
McDonnell Douglas Systems Integration Co.	St. Louis	220
Ernst & Young	New York	200
Grumman Data Systems	Bethpage, N.Y.	186
PRC Inc.	McLean, Va.	180
BDM International	McLean, Va.	180
Price Waterhouse & Co.	New York	180
SHL Systemhouse Inc.	Toronto	149
KPMG Peat Marwick	New York	145
AGS Information Services	Mountainside, N.J.	130
Litton Industrial Automation Systems	Beverly Hills, Calif.	130
JWP Inc.	San Jose, Calif.	130

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Hal Rosenbluth is busily transforming the innovative travel agency that bears his name into a new creation: a vendor of travel-related information and cost-management services

PHOTOS BY KENT HANSON

The Mad Doctor of Corporate Travel

BY RICHARD PASTORE

HAL ROSENBLUTH may be the Dr. Frankenstein of chief executives: His visionary mission is to create a new information services company from the travel-agency body his great-grandfather Marcus brought to life 100 years ago. However, Rosenbluth's experiment seems destined for a happier ending than the doomed doctor's, thanks in large part to his dynamic partnership with IS.

Rosenbluth and his IS organization have already proved an electrifying combination. Together they propelled Philadelphia-based travel agency Rosenbluth Inc. from a $120 million regional firm at the start of the 1980s to a $1.3 billion international player by the decade's close.

While the company's technology is no more leading-edge than that of its top competitors, its systems execution is largely responsible for the agency's leading reputation for delivering "elegant service highly customized to travelers' needs," said Tom Wilkinson, consultant and attorney at travel-management consulting firm Caldwell Associates in Washington.

Now Rosenbluth envisions transforming his firm into a corporate-services provider and outsourcing vendor serving the largest of his 1,500 corporate travel customers. "Our core business is information services," he said. "It manifests itself today in travel and ticketing, but it need not be restricted to that. As more corporations look to outsource [expense-management] services, we hope they might look to us as a result of the trust we've built through our travel relationship."

Rosenbluth puts a lot of emphasis on trust. "It's the missing ingredient that gets in the way of outsourcing today," he said. "Companies don't want to trust their information to an outsider." The agency already handles data entry for third parties at its Clinton, N.D., facility. It has also ventured into the training business, offering seminars in leadership skills and telephone technique.

Despite the agency's experience and reputation for helping firms contain travel expenses, bringing Rosenbluth's vision to life won't be easy, say industry analysts. American Express Co. already dominates the field of corporate expense management, and a number of other travel-services firms are also moving in this direction.

Yet the goal seems more attainable when one considers the track record of Rosenbluth and his IS department—one of the most highly financed in the industry based on percent of sales.

When Congress deregulated the airlines in the early '80s, Rosenbluth's was one of the first agencies to seize the opportunity to add value to ba-

sic ticketing services. He vowed to offer corporate customers the lowest available fares while at the same time steering clear of the dependency on airline-supplied back-room systems.

IT provided the muscle to make it all happen. Proprietary networked reservation and database-management systems "radically lowered the cost of doing business" and differentiated the agency's service from its competition's, said Eric Clemons, professor of Decision Sciences and Management at the Wharton School of the University of Pennsylvania in Philadelphia.

These systems span the reservation process from the front-end task of searching for the lowest fares to the back-end analysis of corporate travel patterns. When a customer requests a flight reservation, Rosenbluth agents call up Precision, a proprietary database listing in descending order of price all fares for a given period between specified city pairs. This price listing, unavailable from any airline computer reservation system, makes practical the agency's guarantee to offer customers the lowest possible fares.

This type of value-added customer service earned Rosenbluth knighthood by management guru Tom Peters, who dubbed the agency Service Company of the Year in 1988.

A quality-control system verifies all bookings made by Rosenbluth agents, checking against a master customer database to verify the accuracy of the passenger record and whether any special customer preferences or requests were honored. It also automatically scans the fare database for lower fares that might have been overlooked or that became available after the initial booking.

The back-end system, dubbed Vision, collects and digests customers' travel patterns and expenses and churns out customized reports that can pinpoint opportunities for savings. For example, Vision helped Consolidated Rail Corp. in Philadelphia identify that 70 percent of its travel occurred among only 13 cities. Leveraging this and other information, Conrail was able to negotiate special volume-based airfares and hotel rates for these locations.

The agency's data center prints and ships an average 7,000 customer reports a month. Customers can also opt to receive raw expense data

Express Service

Corporate travelers can now use their own E-mail systems to request routine reservations 24 hours a day

Rosenbluth Inc.'s latest IS gambit is an electronic-mail link between the agency and its corporate customers. The system, known as E-Res, is expected to begin its rollout this quarter to some of the Philadelphia-based agency's 1,500 corporate accounts. E-Res is software-independent: Customers can use their own currently installed E-mail packages. A translation package handles any conversion necessary between the user's and Rosenbluth's E-mail protocols.

"We think clients will submit travel requests when it's convenient to them; this will provide more accessibility to our service," said Sandra Carpenter, Rosenbluth's vice president of technology and CIO. The current customer-agency interface is very phone-dependent and biased toward an 8 a.m. to 6 p.m. time frame, she said.

Consolidated Rail Corp. in Philadelphia is one early user that appreciates the increased flexibility and time savings. "In an E-mail environment, the line is never busy and you don't get involved in phone tag," said Michael Kabo, Conrail's director of administrative services. While he has seen other travel agencies offering E-mail services, none has been software-independent—a definite advantage for Rosenbluth, he said.

Carpenter anticipates that the biggest payback will come after system modifications eliminate agent involvement altogether. Currently E-Res requires an agent to call up the customer's E-mail request, book the reservation through a separate system and send the customer an E-mail acknowledgment. (Rosenbluth promises a 90-minute turnaround at most for this process.) But if customer acceptance is good, IS will build applications to feed E-mail requests directly into the reservation system. This would speed the process and free agents from routine booking duties, allowing them to concentrate on more advanced (and profitable) services. It should also improve the agency's ability to handle peak booking periods without adding staff.

Even before the phased rollout is complete, the IS staff is contemplating other uses for the E-mail conduit. One might be promotional, with Rosenbluth sending electronic messages to corporate travel managers detailing special vacation packages or new airline superfares. *–R. Pastore*

DAVID MILLER *(left) and* **SANDRA CARPENTER** *(right), Rosenbluth's past and present CIOs.*

on disk or tap into the system's IBM AS/400 brain to rummage online through as many as 20 data fields on their own.

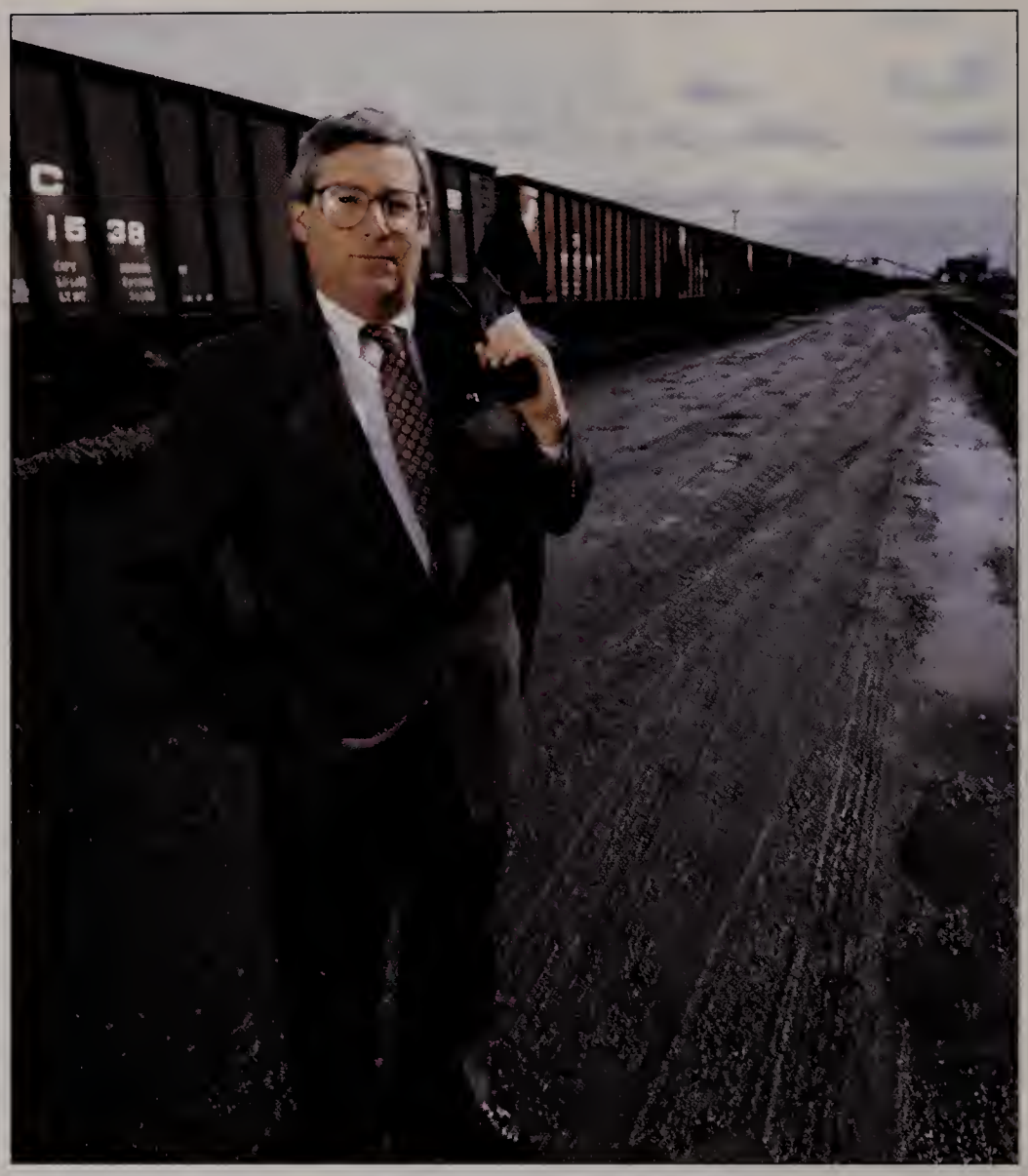
All this information is being put to good use. Each month FMC Corp., a machinery and chemical manufacturer, receives a disk detailing all travel for its Chicago division during that period. After examining patterns and making appropriate adjustments, "we're achieving airfare savings we couldn't get on our own," said Ken Stateler, director of corporate purchasing at FMC in Chicago.

This type of value-added customer service earned Rosenbluth knighthood by management guru Tom Peters, who dubbed the agency Service Company of the Year in 1988. Yet in spite of the accolades, these systems cost Rosenbluth dearly. Clemons estimated that the company spends more on IT than any other travel agency. "If their growth projections had been wrong, they would have bled themselves to death" with this level of IT expenditure, he said.

David Miller, the agency's former CIO and now vice president of global IT, credits Rosenbluth for funding development with a mind toward long-term goals rather than more-immediate paybacks. "I'm not sure we

could have narrowly cost-justified half the systems we've done," Miller said. Even during last year's recession, the company's worst year in recent memory, Rosenbluth chose to continue funding development for the latest system: a software-independent, electronic-mail conduit to corporate customer sites (see related story, Page 46).

Even as he pours funds into IS's veins, Rosenbluth is cognizant that technology can run amok and turn against the company it's supposed to serve. Keeping the silicon safely subservient is the job of the agency's newest mechanization master, Vice President of Technology and CIO Sandra Carpenter. Carpenter came to the firm from Hilton Hotels Corp. one year ago when Miller was promoted to spearhead systems development in the agency's overseas markets.



MICHAEL KABO *thinks the agency should stay on the travel track.*

In addition to her CEO's strong support, Carpenter points to five key tactics that underlie the company's IT success: staff-nurturing programs, formalized contact with external customers, a team approach to decision-making, concurrent development methods and tolerance of failure.

Staff-nurturing programs focus on cross-training and leadership. "I encourage the staff to be industry-knowledgeable," Carpenter said. "I don't want them to be stuck in a position of being just technicians or rote programmers." Most of her staff choose to take optional courses on booking reservations and interacting with customers, she said. She has also set up an Innovative Leader program, in which individual IS employees volunteer to champion staff suggestions for new or improved systems and services.

These programs are partly intended to keep staff from leaving. "Technical people typically change jobs every one or two years for $2,000 and a new widget," Miller complained. With opportunities for cross-training and leadership recognition, hopefully they'll want to stick around. Of those Rosenbluth workers who joined IS prior to 1990 (roughly half the total staff of 80), the average tenure is 5.5 years.

Contact between IS and external customers is close, continual and formal. IS product marketing, established as a department within IS more than a year ago, is charged with learning customer information needs firsthand and reporting back to headquarters. This group steps in again when it's time to initiate customers in a new system. "We get into the nitty-gritty technology like routers and interfaces," said Manager of Product Marketing Beth Mullin. This squad also has a seat on client focus panels—idea sessions the agency conducts with several customers at a time.

This interaction is good public relations if nothing else. "We feel comfortable giving them ideas for future technology enhancements, and they bounce things off us," said Michael Kabo, Conrail's director of administrative services. "Whenever we have broached an idea to Rosenbluth, they've always explored it, and in some cases are [implementing] it."

Team decision-making is critical no matter where systems ideas originate. "That's what I've found most intriguing in coming to this company," Carpenter said. "Everybody is part of that process."

But with the CEO and others contributing their two cents, arriving at agreement is more problematic than if the CIO wielded dictatorial powers. "We may struggle for hours at the table, but we get a more informed decision and better buy-in," Miller countered. "It's easy to get a false consensus with a hierarchical approach."

Concurrent development methods ensure that once a proposal gets the green light, development gets underway in a hurry. "We can't spend a lot of time in research if we're to be a technology leader," Carpenter said. "We have to do it quickly." In developing the new E-mail service, Carpenter's staff trimmed lead time by simultaneously addressing user requirements, finding and installing packaged software and participating in client focus groups.

There's obvious danger in such rushed, concurrent methods. "We run the risk of developing something

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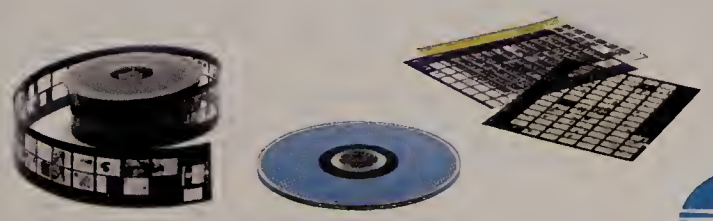

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ahead of its time," Miller admitted. One of the agency's few flops was Reachout, a system that transmitted flight schedules and other data to the corporate customer's own workstation. Rolled out quickly based on input from "a couple of interested customers," it later became apparent that only those few customers were interested in using it, according to Clemons.

Today the danger of a full-scale flop is diluted by deliberate phase-by-phase rollouts, Carpenter said. This allows time to gauge customer acceptance before committing to a full implementation.

Failure is tolerated when a project does go bust. "If we fail, and we have, we rally around that individual and right things quickly," Rosenbluth said. "If [failures] stay hidden away, it's usually too late to do anything to minimize their effects."

When all goes well, the company is not shy about advertising the fact. Indeed, the agency is the industry leader in incorporating IT into its sales efforts, according to consultant Wilkinson. Again, it's the IS product marketing group that shoulders this effort, explaining the systems and their capabilities to potential clients. The CIO herself takes the lead—Carpenter estimates she spends 40 percent of her time making technology presentations to customers.

"Technical people typically change jobs every one or two years for $2,000 and a new widget." With opportunities for cross-training and leadership recognition, hopefully they'll want to stick around.

—David Miller

Showing off technology muscle makes a difference in winning over customers, according to Rosenbluth. "What attracts clients is seeing that we're eager to try new things because of our dedication to technology," he said.

FMC's Stateler for one is sold on Rosenbluth's IS. "The strength of the computer systems is what differentiates one travel-management company from another," he said. "I have not seen systems from any other agency on a par with Rosenbluth's."

Yet some customers aren't too sure that Rosenbluth's eagerness to "try new things" should include expansion into non-travel businesses as he intends. "Companies that do one thing very well and begin to branch out sometimes lose sight of how they got there, and their core business starts to suffer," said Conrail's Kabo. "I'd hate to see that happen with Rosenbluth."

Clemons said he does not expect the agency's travel business to suffer, but he is concerned that the firm might delve into areas where it would have no differential advantage. "There's always that risk," he said. "The industry is littered with corpses of companies that decided to grow their business [in new directions]."

Rosenbluth, however, seems coolly confident. "We're developing systems right now that could replace travel agencies," he said. He admits, though, that his private firm's freedom from short-term-minded shareholder scrutiny allows him to indulge in technology experiments without fear of Wall Street reprisal. "[And] we don't anticipate going public anytime soon," he added with a grin.

Indeed, if hypothetical shareholders knew Rosenbluth and his IS accomplices were calculating the demise of today's travel agency, they might grab their class-action torches and storm the gates of the agency's stronghold atop Philadelphia's tallest skyscraper. Barring that, Rosenbluth's IT experiments will press on with all possible dispatch. CIO

TECHNICAL PROFILE

Rosenbluth Inc. is a 100-year-old, privately owned travel agency headquartered in Philadelphia. The company's U.S.-based revenues grew from $120 million in 1980 to $1.3 billion a decade later, with most of its sales coming from corporate travel. The firm employs more than 2,600 people at over 530 locations in the United States, London and Singapore. The IS department has a staff of 80.
One of the nation's top-five travel-services companies, Rosenbluth is noted for its airline-independent, value-added reservation and travel-pattern-analysis systems. Among its 1,500 corporate clients are DuPont Co., Eastman Kodak Co. and several General Electric companies.

Host systems: The IBM shop runs one IBM AS/400 Model E90, a Model D80, and one Model B70 as its main systems. It also employs an IBM 9371 as an electronic-mail backbone.

Software: Rosenbluth is evaluating computer-aided software-development packages to replace or augment its RPG III host-development environment.
The agency subscribes to seven airline computer reservation systems.

End-user computing: Approximately 2,000 networked DOS-based personal computers are deployed throughout the country. Packaged systems include Lotus Development Corp.'s cc:Mail, Borland International Inc.'s Paradox and WordPerfect Corp.'s WordPerfect. The agency is adopting IBM's OS/2 as one of its PC development environments and does its programming with Microsoft Corp.'s C and Borland International Inc.'s C++ languages.

Networking: Wide area networking is partly fiber-based and partly T1, and it incorporates X.400, X.25 and SNA protocols.

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HERE, THERE AND EVERYWHERE

The term "logistics" has a technical ring, but it describes a delicate art: the art of orchestrating the movement of myriad elements so that each appears where it should, when it should.

Driven by competitive pressures, many organizations are making a science of perfecting that art. By upgrading their logistics capabilities—and outsourcing those logistics functions that others can manage better—they can control the flow of materials and information more effectively, deliver goods and services more quickly, and maintain minimal inventory levels while reducing associated capital and warehousing expenses.

The current focus on logistics follows a decade in which manufacturers have moved to adopt just-in-time (JIT) inventory strategies to manage incoming materials. Their suppliers, faced with the need to provide timely service, are tightening control over their own operations. "It's almost as though the JIT revolution that occurred in manufacturing is moving over to the distribution arena," said Lisa Henriott, executive director of marketing at Atlanta-based CAPS Logistics Inc., a vendor offering PC DOS-based routing software.

Large retailers—including Wal-Mart and Kmart, for example, which have invested in quick-response systems to tighten control over their inventories—are forcing their suppliers and competitors to focus on timely production, distribution and tracking. And even service industries, which have traditionally paid little attention to the subject, are becoming more logistics-savvy.

The logistics strategy that a company puts in place today will have a major impact on its success and may even control whether it will survive in the long term, according to James K. Mueller, director of the International Logistics and Transportation Practice at the New

Logistics isn't just about transportation—it applies to the entire distribution pipeline. And companies are finding that they need to tighten their control over that pipeline if they hope to keep costs down and customers satisfied.

BY LUCIE JUNEAU

ILLUSTRATION BY R. KENTON NELSON

York office of consultant Ernst & Young. "Successful managers recognize that logistics management is becoming the cornerstone of corporate strategy," Mueller said.

Although sometimes narrowly defined to apply to transportation alone, logistics can have a much broader scope, encompassing the entire distribution pipeline linking companies to their suppliers and customers. "We like to include linkages to the customer on the outbound side and linkages to vendors on the inbound side, linkages to carriers on both sides, and any intermediaries—wholesalers, for example—that might be involved," said Matt Anderson, senior associate in the operations practice at Mercer Management Consulting Inc., in Lexington, Mass.

Linkages to vendors typically include purchasing, materials management and warehousing functions. On the outbound (customer) side, logistics functions include order management, finished-goods inventory, warehousing, distribution and transportation, according to Anderson.

Obstructions anywhere along this pipeline can slow the flow of materials and information, and ultimately degrade customer service. Identifying problem areas is therefore the first step in reevaluating logistics strategies.

Although problems may be localized in one department—for example, the transportation or warehousing group—the greatest cost savings are usually achieved by integrating the supply chain or linking all of the functions in the distribution pipeline so that information can flow freely, Anderson said. Providing electronic links to other operating areas—such as manufacturing or finance—is important to making the fullest use of available information.

Before implementing a set of integrated software systems in 1990, Pittsburgh-based SmithKline Beecham Consumer Brands U.S., which markets 30 health- and personal-care brands nationwide, was plagued by inadequate inventory levels. Its order-fill rates, which indicate how often the company delivers 100 percent of a customer order, needed improvement as well, according to Rich Podgurski, director of MIS.

Because SmithKline's manufacturing and financial systems weren't integrated with one another or with the distribution and order-entry functions, time was wasted entering redundant information, and discrepancies occurred in the information maintained by various departments. Specifically, the financial group maintained different inventory balances from the manufacturing and distribution groups. "We always had to keep more inventory than we needed, because we were never sure how much there was," Podgurski said.

To integrate its logistics pipeline, SmithKline implemented—and integrated—three new logistics packages. One, an MRP II system called Prism from Newton, Mass.-based Marcam Corp., handles all of SmithKline's manufacturing operations. DCS/Logistics from Andersen Consulting, headquartered in Chicago, provides order-entry capabilities, maintains finished-goods inventory levels, provides warehouse-management capabilities, and handles outbound functions such as truck-loading. A third product, Logistics*Plus from STSC Inc. in Rockville, Md., manages the company's distribution requirements, planning and sales-forecasting functions.

Now all departments access the same information, and each knows precisely what's in inventory. As a result, SmithKline has reduced inventory levels by about a week's worth of goods, close to $2 million, Podgurski said.

SmithKline's goal was that of many companies: to improve customer service while maintaining lower inventory levels. "In today's world, no one wants any inventory, but they want to have 100 percent service levels," said Bill Brown, managing partner of Logistics Consulting Partners International in Alexandria, Va. Brown and other analysts agree that growing customer demands—and pressure from competitors who can meet those demands—are driving organizations to upgrade and integrate their information systems.

Serono-Baker Diagnostics Inc., a medical-instrumentation maker in Allentown, Pa., sought to improve its logistics capabilities because it couldn't respond to customer requests as quickly as some of its competitors. "When a client called to ask about the status of a shipment, we'd have to say, 'We'll call you back,' " said Sal Runfola, director of special projects at Serono. (Runfola has since left the company.) The delay put them in danger of losing some customers, he said.

Laying the Logistics Groundwork

- **LINK logistics to your corporate business strategy.**
- **ORGANIZE comprehensively, breaking down barriers between departments.**
- **EMPHASIZE human resources, encouraging personnel from different departments to work together when appropriate.**
- **FOCUS on financial performance, recognizing that logistics costs have a direct impact on the bottom line.**
- **DEVELOP international logistics effectiveness, starting with an emphasis on customer service and considering current political and economic realities.**
- **MAKE the best use of information, integrating systems so that all of the organization's departments can communicate.**
- **FORM strategic alliances, so that product, raw-material or service providers take a vital interest in the success of your firm and are integrally linked with your operations.**
- **TARGET optimal service levels; manage details; measure and continually improve performance.**

SOURCE ERNST & YOUNG

For Serono, the solution was a set of fully integrated software modules that would improve communications among departments. The company invested in a package called CA-PRMS Enterprise Solutions from Computer Associates of Garden City, N.Y., that includes financial modules, a master production schedule, modules for materials- and capacity-requirements planning, shop-floor and inventory control, order entry, invoicing, product structure, purchasing and forecasting.

Because the package is fully integrated, every transaction is visible to every user in the organization via inquiry screens. That means that customer-service representatives can answer questions regarding orders and access customers' histories on the spot. And the purchasing department's ability to access the master production schedule means it can order materials a year rather than two or three months in advance, allowing it to negotiate better prices with suppliers.

"We can enter an order and print a shipping document within minutes," said Runfola. "Before, it would take us at least half a day. And we can invoice the same day we ship. Previously that took us three days. It's like we've come out of the dark ages."

Because an organization's computer systems can have a major impact on its ability to communicate both internally and with business partners, CIOs often play an important role in identifying and recommending logistics solutions. But any evaluation of logistics capabilities also needs to address organizational and policy issues, according to SmithKline's Podgurski. "A problem as big as logistics can't be solved with just computerization," he said.

Logistics leadership should come from top business managers, who must define, outline and support logistics functions, said Logistics Consulting's Brown. Some organizations are even adding executive-level logistics-management positions to the corporate hierarchy.

Chiquita Brands' Cincinnati-based John Morrell & Co., which sells $2.2 billion in meat products a year, recently appointed William Arbuckle to the new position of senior director of logistics. About 400 employees in the company's warehousing, transportation, inventory-management and customer-service operations now report to Arbuckle, who in turn reports to the vice president of facilities management. Before the position was created, responsibility for logistics operations was diffused among individuals throughout the organization.

> *"In today's world, no one wants any inventory, but they want to have 100 percent service levels."*
>
> *—Bill Brown*

In addition to keeping tabs on logistics costs, Arbuckle's office tracks performance statistics such as cas-

Picking Your Package

A buyer's guide to logistics solutions

Shopping for computer-related logistics solutions should be a collaborative effort between IS and users, experts say. IS must ensure that potential solutions are technologically feasible, but the selection process should be based on users' needs.

Buyers should look for packages featuring up-to-date technology, because they will be the most flexible, says Matt Anderson, senior associate in the operations practice at Mercer Consulting in Lexington, Mass. Specifically, buyers should select packages based on fourth-generation languages that include relational databases.

Managers should make sure that any packages they're considering will be easy to integrate with existing software, if appropriate. Large companies, which tend to have wide product lines and multiple divisions, are more likely to mix and match logistics solutions than smaller firms with narrower logistics requirements. They are also more likely to have the IS resources to integrate multiple vendors' products.

Small firms, on the other hand, tend to select single-vendor solutions to keep things simple and provide consistency among modules.

Anderson mentioned several products that he considers to be among the top integrated-logistics solutions on the market:

For DEC platforms:

- DCS/Logistics from Andersen Consulting in Chicago
- Tolas from GSI Transcomm in Pittsburgh
- MDS from Distribution Architects Intl. in Tempe, Ariz.

For IBM mainframes:

- Amsoft products from American Software Inc. in Atlanta
- DCS/Logistics from Andersen Consulting in Chicago
- Demand Forecasting/Distribution Resource Planning from Dunn & Bradstreet Software in Atlanta

For IBM minicomputers:

- CA-PRMS Enterprise Solutions from Computer Associates of Garden City, N.Y.
- Business Planning and Control System from System Software Associates Inc. in Chicago

es ordered to cases shipped, orders shipped complete, and on-time deliveries. "It's important that we get that kind of information through our systems, monitor it and constantly improve," Arbuckle said. "Those are all things we did not do before."

This year, with Arbuckle's help, the company expects to save around $3.5 million in logistics expenses. The bulk will be realized by renegotiating contracts with third-party warehousing companies, redesigning warehousing flows in company-owned buildings and installing new technologies—such as optical scanning devices—in the warehousing and manufacturing areas.

Outsourcing certain logistics functions, especially transportation and warehousing, is sometimes an attractive alternative to upgrading all of an organization's internal capabilities. Although CIOs don't always have the final say on third-party providers, their input is usually influential, said David L. Anderson, associate partner of Strategic Services West at Andersen Consulting in San Francisco. Morrell, which pays $66 million a year in freight expenses, is currently evaluating outsourcing providers for its freight-payment operations. Arbuckle will make the final decision, but he won't be selecting a provider that the firm's CIO, Doug McDowell, can't recommend.

Arbuckle already outsources approximately 25 percent of Morrell's warehousing, and that figure will probably continue to grow. Outsourcing warehousing operations gives the company flexibility without capital investment. "We open and close plants all the time, and that changes where the warehouses should be," said Arbuckle. "It's much easier to go to a public warehouse. I don't have to buy forklifts, pallet trucks and all the things that come with running your own warehouse."

Warehouse operations have been among the last to benefit from automation technologies, according to Bob Erickson, vice president of the warehouse management system group at Pittsburgh-based GSI Transcomm. But managers are beginning to realize that there is a lot of productivity to be gained in that area. "[Warehouse-management systems] can make sure that the product—the right product in the right amount—is out the door on time," said Erickson.

A few years ago, Aubrey L. Miller, vice president of operations and CIO at Brendle's Stores Inc. in Elkin, N.C., designated a new warehouse-management system as the top priority for the retailer. Brendle's had previously relied on a totally manual system, but that was back when it owned only 20 stores. Today, with over 50 stores spread throughout the Southeast, "I don't even think we could do the job with a totally manual operation," Miller said.

Brendle's chose GSI Transcomm's Tolas. In conjunction with that system, it uses radio frequency (RF) terminals linked with a DEC VAX 6000 to move goods throughout its distribution facility. Warehousing modules that interface with RF terminals have smaller video displays than most terminals and don't need to be connected to their hosts via wire. Typically hand-held or mounted on a forklift, they are easy to maneuver around the warehouse floor.

By scanning the bar coding on a package, an operator using such a terminal can capture information and immediately update a centralized database on the host system. The information can then be used to bill clients or reduce inventory levels, for example.

Warehouse operations have been among the last to benefit from automation technologies. But managers are beginning to realize that there is a lot of productivity to be gained-in that area.

Analysts say that the future of logistics technology will include more use of the client/server architecture, and of such technologies as voice-response and -recognition systems, two-dimensional bar coding, artificial intelligence and expert systems.

The increasing use of JIT inventory and manufacturing strategies, a renewed emphasis on customer service and the growth of transnational competition are just some of the factors that have turned the spotlight on logistics. IS executives can play a critical role by supplying their organizations with the "how" for tracking "where" and "when." CIO

Lucie Juneau is a freelance writer based in Salem, Mass.

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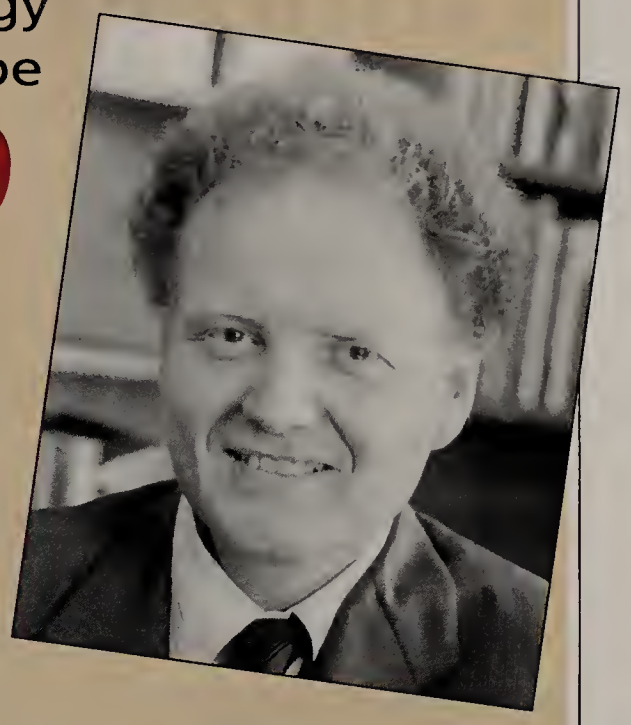

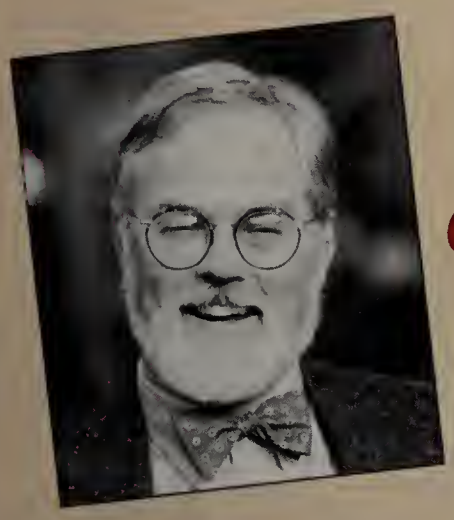

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Good Connections

By providing links among disparate components, middleware makes possible the transition to open systems

BY BARBARA E. SANNERUD

Middleware—software whose role is that of an integrator—is a new concept that could change the way software is developed, marketed and purchased. It is the glue that binds operating systems and applications together, addressing gaps in the software topology. It serves the complex computing environment that will be characteristic of the '90s, where handshaking between competing and often-proprietary software components is crucial to the success of open systems.

Middleware can be nested, providing connectivity layers to other connectivity layers. As application layers become further removed from the intricacies of the operating system, new intermediate layers emerge, creating a denser, more-complex configuration. The tinkertoy of the software industry, middleware is a fundamental requirement in designing open systems.

ILLUSTRATION BY TED PITTS

Products include front-end tools that allow programs to be ported across various graphical user interfaces, interapplication communications services, connectivity software, and database gateways, both proprietary and open. Even operating systems can be stripped down to their most fundamental kernel, with ancillary services layered as middleware.

Middleware extends users a degree of investment protection. With open-systems middleware, users are not locked into one particular vendor's solution, and if vendor problems surface, the user has the option of selecting another supplier. For this reason middleware is often jokingly referred to as "escapeware."

Middleware has been around for some time, shielding applications services from the underpinnings of the operating system. Any user who has worked in a heterogeneous shop will attest to the fact that there has always been a demand for it. But it only stepped into the spotlight recently, with increasing industry emphasis on openness, interoperability and connectivity.

For vendors, middleware presents both an opportunity and a threat. Its appeal lies in the fact that it is the building block of open-systems software. Every vendor pledging allegiance to "openness" has to become a sponsor for middleware by either developing its own products or marketing someone else's. This is good news for users, because vendors are increasingly encouraged to port software to multiple platforms, providing a greater variety of less-expensive options.

On the other hand, middleware also has the potential to erode vendor profit margins on proprietary systems. Providing too many middleware choices might expedite the migra-

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tion of a vendor's customer base right into the arms of the competition. Some vendors might compromise by providing just enough middleware to satisfy bare-bones user requirements but not enough to be truly open.

The software industry has undergone a sea change. Users will no longer buy operating systems, databases and networks from a single vendor. Rather, they will purchase layers of software (GUIs, RPCs, object-request brokers, frontware, gateways) from a variety of vendors. The mega-architectures (SAA, for example) have lost their appeal, but the alternative building-block approach of open systems remains risky.

With middleware, software solutions can become granular, less binding and more commoditized. Middleware can resolve the still-present incompatibilities of fit among various software products. By purchasing it one piece at a time, users are taking steps toward realizing a complete software solution. However, until some standards-setting organization can guarantee performance and efficiency of integrated middleware components, the burden of proof that the completed system will perform as expected will continue to rest on the user. Users dealing with a greater number of suppliers will have to become more sophisticated about integration issues—learning to manage the various middleware technologies and fitting all the software pieces together themselves—or else turn the effort over to a professional systems integrator.

While middleware will provide flexibility and options for users, there are some caveats as well. For one thing, excessive middleware can create a fragile system of many linked pieces; obviously, a weak link can threaten the entire chain. And having too many middleware layers can result in a vendor- and product-management nightmare, in which some vendors might try to pass the responsibility for the maintenance and repair of their product on to the next

Middleware Wares

A sampling of vendors and products

Microsoft Corp., Redmond, Wash.
ODBC: Interface that allows Windows- and Mac-based applications to access a variety of databases on different host systems

Netwise Inc., Boulder, Colo.
Netwise System: RPC development tools that allow programs running on different platforms to operate as an integrated whole

SunSoft Inc., Mountain View, Calif.
ToolTalk: Development-oriented; provides communications between Unix applications using object-oriented or multicast messaging

TechGnosis Inc., Boca Raton, Fla.
SequeLink Client/Server Middleware: Gives Mac, Windows, OS/2 and Unix applications access to data/services across many networks

XVT Software Inc., Boulder, Colo.
XVT Extensible Virtual Toolkit: Graphical interface toolkit for developing applications portable among OS/2 Presentation Manager, OpenLook, Motif, X-Windows and Macs.

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middleware supplier.

When shopping for middleware from a variety of vendors, users must precisely define the vendors' roles. To ensure that products will perform as expected when many layers are integrated into the overall system, users might consider writing performance criteria into their contracts.

Users should avoid middleware that adheres to proprietary vendor standards. Even when dealing with products that are part of an open-systems initiative, users must realize that middleware layers espoused by one open-systems consortium will not necessarily match those preferred by another. Users may have to invest in middleware that supports a common denominator of open-systems components—a compromise they may be unwilling to make.

Modular application design makes it easier to know where middleware can be utilized in new systems. In this approach, the front end or presentation layer is uncoupled from the logic and data-access layers, thus separating the code and reducing the dependencies among layers. This process resembles the design one would undertake to develop any client/server application. For legacy systems, middleware can provide gateways and quick access to data on other platforms or stored under different database management system technologies. There has been a surge in the market for SQL access tools, for example, which address this issue.

As middleware proliferates and eventually evolves to commodity status, vendors will seek new ways to preserve revenues. One possibility is that middleware architectures will be self-serving, optimizing one vendor's performance or solutions at the expense of another's. Users should look closely at middleware from vendors trumpeting the interoperability message while investing heavily in proprietary architectures or "closed" consortia. Because hardware vendors are in business to push iron, they will be motivated to provide middleware if and only if there is an accompanying hardware drag. For example, IBM endorses open-systems middleware but has alluded to embracing the Open Software Foundation's DCE connectivity software on only "some" selected platforms. Clearly IBM should not try to fix what is not broken; its proprietary software pays off. Users should ask vendors to document their commitment to both open and proprietary middleware software.

Middleware can lower porting costs, catalyze new software markets and encourage the development of open systems. It will offer users a degree of platform flexibility and the freedom to switch software parts without undue penalties. In short, it provides advantages for both users and vendors. Nevertheless, users should be selective when evaluating middleware, lest it generate yet another flavor of vendor lock-in. CIO

Barbara E. Sannerud is director of management consulting at the Gartner Group in Stamford, Conn.

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Editorial, Advertising and Business Offices: 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208–(508) 872-8200. **Postal Information:** CIO (ISSN 0894-9301) is published monthly; and semimonthly in April, May, June, September, October and November by CIO Publishing Inc., 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208. Second-class postage paid at Framingham, MA, and at additional mailing offices. **Reprints:** Copyright 1992 by CIO Publishing Inc. All rights reserved. Reproduction of material appearing in CIO is forbidden without written permission. Send all reprint requests to Permissions Editor, CIO, 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208. **Photocopy Rights:** Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CIO for users through the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, Massachusetts 01970. Please specify ISSN 0894-9301. Perrmission to photocopy does not extend to contributed articles followed by this symbol: ‡ **Microfilm:** CIO issues and articles can be purchased on 16mm and 35mm microfilm and on 105mm microfiche through University Microfilms International, Serials Acquisitions Department, 300 N Zeeb Road, Ann Arbor, Michigan 48106. **Subscriptions:** Address subscription inquiries to CIO, 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208 or call (800) 788-4605. CIO is distributed free of charge to qualified top information executives. To all others, the one-year basic rate for the U.S. and Canada is $94. For rates to other countries, please write the publisher. The single copy price is $7. All subscriptions payable in U.S. funds only. Please allow four to six weeks for new subscriptions to begin. **Change of Address:** Please allow four to six weeks for change of address to take effect. **Postmaster:** Send change of address to CIO, P.O. Box 489, Northbrook, Illinois 60065-9816

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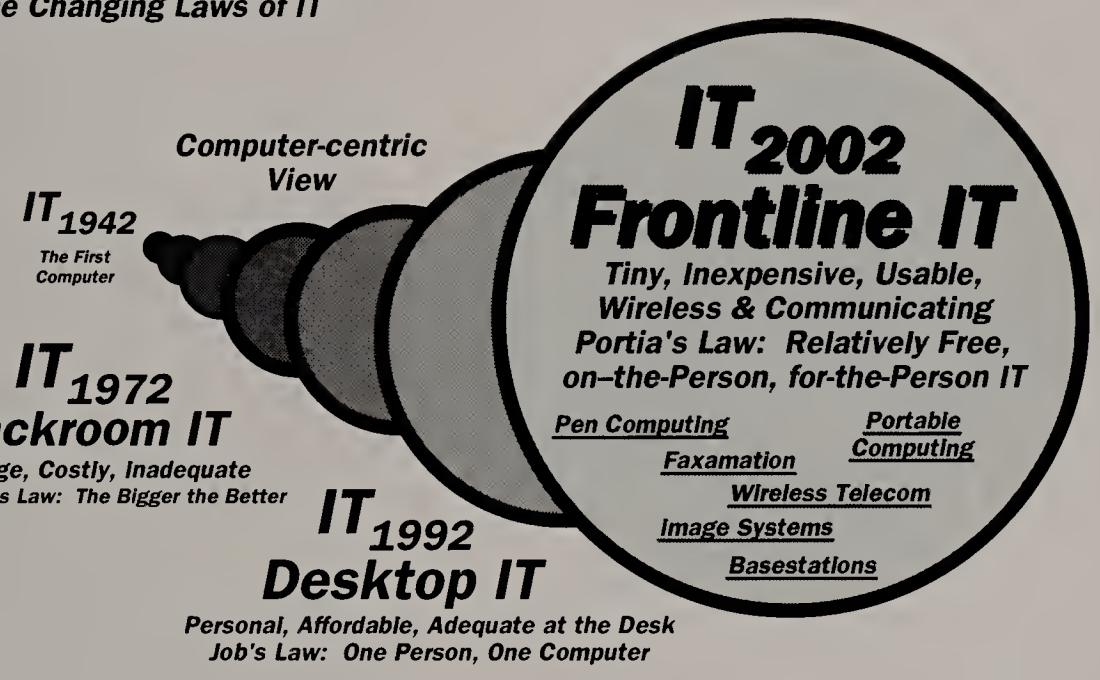

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Held Over By Popular Demand

When two software companies decided to join forces, their executives used videoconferencing to smooth the process. Once the merger was complete, the technology evolved into an all-purpose tool used by employees companywide.

Time and money are valuable commodities, and executives at McCormack & Dodge and Management Science America faced the prospect of spending lots of both. In 1989, the two software companies began merger discussions that required many high-level meetings. However, because their respective headquarters were in Natick, Mass., and Atlanta, getting together took time, effort and airfare.

Consultants from Bain & Co., a management consultancy in Boston, proposed that the two firms install a videoconferencing system to manage the merger process (which would result in the creation of Dun & Bradstreet Software, headquartered in Framingham, Mass.). The system would be used exclusively by executives as a way to reduce travel and enable spur-of-the-moment, time-critical meetings. "Having the system definitely accelerated merger activities," said Wayne Porter, D&B Software's director of telecommunications.

The merger was finalized in June 1990, with the new company retaining the geographically dispersed offices. Although the videoconferencing system had originally been intended to last only for the duration of the merger, it soon became apparent that the company could make productive use of it for other purposes as well.

Many departments and groups at D&B remain divided between the two locations. For example, the CIO and voice-communications staff work in Atlanta, while the mainframe data center and other IS staff call Framingham home. With similar arrangements throughout the company, videoconferencing found new life as a tool to bridge the geographic gap and help disparate groups function as one entity.

Both locations are equipped with conference rooms housing the V-3100 videoconferencing system from PictureTel Corp. of Peabody, Mass. The stand-alone system includes a 27-inch color monitor, color cameras, a desktop control panel and a document camera for transmitting documents and computer screens of information. The V-3100 operates on two 56K channels and supports two-way full-motion video, audio, graphics and data communications. All software is provided by PictureTel. In addition, each room has a fax machine with hot keys that expedite the transmittal of pertinent documents at the touch of a button.

The conference rooms are now booked about 80 percent of the time, compared to 50 percent when the merger was in the works, according to Porter. Executive-level employees make up a minority of users. Employees in technical development, marketing and client and internal support are the most frequent users.

"Videoconferencing enhances a meeting, especially among the employees who don't know each other," said Porter.

Since the initial installation, Porter has overseen a couple of enhancements. Omnidirectional microphones have been built into the ceiling, eliminating the need to adjust audio. People can speak freely in a normal tone of voice, which makes the technology less obtrusive. And D&B recently leased a dedicated T1 line that eliminates dial-up and usage charges.

Porter estimates that travel between the two HQs has been cut in half. Soon D&B sites in France and Australia will be added to form an international network.

The system has earned its keep by evolving with D&B. In Porter's opinion, the technology has made the leap from a one-situation solution to a mainstay of day-to-day operations. *–Megan Santosus*

VITAL STATISTICS

Organization: *Dun & Bradstreet Software, Framingham, Mass.*

Application: *Videoconferencing system*

Scope: *Employees from a variety of departments and levels located in the Framingham and Atlanta offices*

Sponsor: *Management consultants Bain & Co., of Boston*

Technologies: *PictureTel's V-3100 Videoconferencing System operating on a dedicated T1 leased line*

Objective: *To reduce travel and enable spontaneous communication during the merger process*

Value Added: *After facilitating (and accelerating) the company's merger activities, the system was adopted by employees companywide as a means to enable teamwork and cut travel expenses for geographically dispersed staff.*

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